SEARCH NOTES

09/560,779

WEST Search History

DATE: Monday, March 10, 2003

Set Name side by side	Query	Hit Count	Set Name result set
DB=USPT; PLUR=YES; OP=OR			
L5	L4 and l3	44	L5
L4	@ad<20000428	2983891	L4
L3	L2 and l1	46	L3
L2	check near5 (picture or image or photo or photograph$)	5049	L2
L1	705/45	196	L1

END OF SEARCH HISTORY

WEST

Generate Collection | Print

L5: Entry 7 of 44 File: USPT Feb 20, 2001

DOCUMENT-IDENTIFIER: US 6189785 B1
TITLE: Demand deposit account data processing system

DATE FILED (1):
19980414

Brief Summary Text (6):
A typical prior art electronic funds transfer system 10 is shown in FIGS. 1a and 1b. The prior art system 10 comprises a point of sale terminal 22 that includes a printer, a display monitor, and a magnetic card and/or a checkreader. The point of sale terminal 22 also has associated therewith a microfilm camera 23 that photographs a completed check 20 presented by a purchaser. When a roll of microfilm is complete, the merchant delivers 24 the film cassette to the merchant's financial institution. The point of sale terminal 22 is connected to a central processing/communication system 25 by a direct line or by dial-up communications, and this central system 25 is adapted to review information received from the point of sale terminal 22 in order to determine whether a transaction should be authorized or denied 28 and to record and log 40 all information relating to the transaction for later retrieval and analysis.

Detailed Description Text (4):
This most preferred embodiment comprises an integrated system that combines automated check information capture, automated payor information capture, and electronic check authorization processes with automated settlement options and back office exception item processing. This ability to settle items on line, especially when combined with a system capable of dealing with exception items, e.g., correcting and repairing errors in demand deposit account data by reference to the stored check image, represents a significant improvement over prior art check and ATM electronic debit processing systems.

Detailed Description Text (5):
The check 110 bears an ABA MICR encoded account number pre-printed on the face. Also pre-printed on the face of the check 110 are various image fields such as the payor's name and address, the sequence number of the check, the name and address of the financial institution that is the data source for the check 110, and various blank fields such as date, amount, and signature that are filled in manually by the payor in order to initiate a transaction.

Detailed Description Text (10):
The provision of this check imaging scanner 113 and the transmission of data captured by the scanner 113 to the host data warehouse 114 overcomes significant disadvantages of prior art check imaging systems that use camera and film-based information storage. These prior art systems photograph the check at the point of sale, and the film must then be transported manually to the merchant's financial institution. The present invention eliminates this delivery step and makes the scanned information available to anyone with computer access to the host data warehouse 114.

Detailed Description Text (24):
If the demand deposit account data is either not reformatted or is reformatted incorrectly, is submitted to the respective financial institution data source 128, 129, and is returned 131 for an invalid account number or a not-located account, then another exception condition arises. The database software in this case obtains the stored check image from the host data warehouse 114, uses this image to correct 133 the demand deposit account data, and thereafter resubmits 130 that corrected demand

deposit account data to at least one of the financial institution data sources 128, 129 for settlement.

Detailed Description Text (26):
Certain exception conditions relate to unusual account activity identified by the velocity/risk database 120 and to periodic manual checks designed to ensure the system is working properly. Under these conditions, a specific referral code may be delivered from the central system 109 to the point of sale terminal 112. A merchant receiving a referral code must contact an authorizer at the central processing/communication system 109 and provide the referral code to the authorizer. The authorizer then enters the code to retrieve the check image and/or check sale information from the host data warehouse 114 and, assuming that such information has not already been entered on line, prompts the merchant to enter the payor's identification information, such as name, address, and phone number, into the point of sale terminal 112. If authorized by the authorization process 117, the authorizer will provide a unique transaction identification number and an approval number for the merchant to enter into the point of sale terminal 112 as prompted.

Detailed Description Text (28):
These features of the most preferred database software program are substantial advancements over prior art check processing systems because they provide a merchant with unprecedented flexibility in a point of sale transaction and a customer with unprecedented efficiency of service. For example, the ability to recognize errors in demand deposit account data and refer to the image information obtained by the check imaging scanner 113 and stored in the host data warehouse 114 for correction and repair, gives a merchant the opportunity not only to request additional information from the payor at the point of sale, but also obviates the inconvenience experienced by customers who submit valid demand deposit account data that is subsequently garbled by, for instance, a malfunctioning checkreader.

Detailed Description Text (34):
Having now described the apparatus of the present invention in detail, the method by which this apparatus accomplishes verification, authorization, and settlement of a transaction is hereafter explained. At the point of sale terminal 112, the check 110 is presented and swiped through the checkreader and the optional check imaging scanner 113 to record an image of the check 110. In the case of a bank card 111, the magnetic stripe of the card is swiped through a card reader incorporated into the point of sale terminal 112. Message prompts are driven down to the display monitor incorporated into the point of sale terminal 112 from the central system 109 to prompt for capture of the sale data and payor identification information. Merchant-specific central system 109 processing tables generate additional message prompts that are unique to the merchant's business, such as authorization receipts specific to electronic funds transfer authorization requirements and state service fee disclosures. The point of sale terminal 112 is connected to the central system 109 either through a direct line or through dial-up communications. The payor's account information, whether MICR, OCR, or magnetic stripe encoded, and the check image and payor identification information are sent to the central system 109 for verification and storage, respectively. The sale data is sent to the central system 109 for authorization.

Detailed Description Text (35):
Immediately upon completing delivery of all the information prompted for by the point of sale terminal 112, a unique transaction identification number is assigned 124 to the data by the central system 109 for later retrieval should the item be returned. This unique transaction identification number is also used when storing the check image in the host data warehouse 114. The transaction, which comprises at least the payor's account information and the sale data, then enters the authorization process 117, and the item is verified via authorization algorithms and the plurality of databases 118, 119, 120, 121, 122, 123.

Current US Cross Reference Classification (3):
705/45

Issued US Cross Reference Classification (3):
705/45

Field of Search Class/SubClass (7):
705/45

WEST

Generate Collection Print

L5: Entry 13 of 44 File: USPT Feb 1, 2000

DOCUMENT-IDENTIFIER: US 6019282 A
TITLE: System and method for commingling items destined for multiple payors in a single electronic pocket and financial infrastructure employing the same

DATE FILED (1):
19980306

Detailed Description Text (3):
Partner FIs 101A and 101B receive paper checks 111, usually deposited by their respective customers. After their deposit or cashing, the checks are "captured" by the CPCS 107, usually after the close of business on the day they are received. The capture process begins by passing the checks through check sorting machines (not shown). The sorters read characters on each paper check that are printed with magnetic ink and are provided to a magnetic ink character recognition ("MICR") system for conversion to data to be stored in a CPCS mass data storage file ("MDS") (not shown). The printed characters are sometimes collectively referred to as the MICR line and the complete set of MICR-line data is sometimes called a check "image" or "code line," as it contains most of the pertinent data on the check. The records in the CPCS MDS include fields for the R/T number of the payor FI (the FI on which the check is drawn), the account number of the customer who wrote the check, the serial number of the check and its amount. Based on the R/T number on the check, the CPCS 107 directs the sorter to pocket the check for the FI on which it is drawn.

Current US Cross Reference Classification (2):
705/45

Issued US Cross Reference Classification (2):
705/45

Field of Search Class/SubClass (4):
705/45

L5: Entry 17 of 44 File: USPT Aug 17, 1999

DOCUMENT-IDENTIFIER: US 5940844 A
TITLE: Method and apparatus for displaying electronic image of a check

DATE FILED (1):
19950505

Abstract Text (1):
A method and apparatus for storing and retrieving images of documents, e.g. checks. The method comprises placing a plurality of documents in a document imaging machine and forming an electronic image of each document, storing each electronic image in an electronic storage device, providing at least one user interface device in communication on a communication link with the electronic storage device, placing a request for at least one document image on the user interface device, transmitting the request by the communication link to the electronic storage device, searching the electronic storage device for the requested electronic image of the document, retrieving the at least one electronic image or providing an indication that the image was not found, storing the electronic image, if found, in an electronic file, for transmission to the user interface device at user option, providing the electronic image to the user interface device at command of a user at the user interface device for storage at the user interface device and displaying the requested electronic image on a display of the user interface device. Preferably, the electronic, images are stored with embedded identifying information in a TIFF.RTM. (trademark of Aldus Corp.) file format and the check images can be displayed on a display device which permits the user to view both sides of the checks simultaneously and perform functions such as zooming and rotation of the images.

Brief Summary Text (2):
With the present day increase in the number of checks and other financial instruments processed by banking institutions, there is an increased need to automate the requesting, delivery and display of check and other financial instrument copies. This invention accordingly relates to an electronic system for storing and retrieving electronic images of checks and other financial instruments. The system of the invention is particularly adapted to the storage and retrieval of check images and the images of other commercial paper instruments, but could also be employed to store and retrieve images of other documents.

Brief Summary Text (12):
Whether the original checks are kept or they are reduced to microfilm, and regardless of whether it is maintained by the payor bank or the customer, it is readily understood that there are many costs associated with maintaining a check archive and retrieving check copies upon request. For example, the production and manipulation of microfilm libraries is a labor intensive process and the quality of the photocopies produced is often low. Although storing a high resolution digital image of the front and rear surface of a check could be used as a potential replacement for microfilm, the cost of storing all checks in such format, and the difficulty inherent in locating and retrieving them, made this storage media impracticable in the past.

Brief Summary Text (15):
While previously many banking institutions were forced to maintain large staffs of people to handle manually the time-consuming and tedious task of processing check copy requests, it is desirable to provide a system whereby a customer of the banking institution can request, retrieve, and display copies of checks and, preferably, generate correspondence with a copy of a check, i.e. a check image, all without bank

staff involvement. Thus, the present application is directed to an automated system which retains images of the front and back of each check and data associated with that check. The associated data includes the account number, the check number and the check amount as well as image data. The system allows a user to request, retrieve and display check copies with turnaround time much faster than in the prior art.

Brief Summary Text (19):
It is another object of the invention to provide a new method and apparatus for capturing, processing and storing check images for on-line access.

Brief Summary Text (20):
It is yet another object of the invention to provide a new method and apparatus for communication for the purpose of requesting and receiving check images.

Brief Summary Text (21):
It is yet a further object of the invention to provide a new method and apparatus for locally storing, displaying and utilizing check images in industry standard computer office automation environments.

Brief Summary Text (26):
It is another object of the invention to provide a system having the ability to index and store check images in a relational database supporting appropriate access and inquiry requirements.

Brief Summary Text (27):
It is furthermore an object of the invention to provide a system having the ability to create a permanent, reliable, legal and auditable store record of check images, superior to that available in the current system of microfilm, photocopy and paper records.

Brief Summary Text (29):
It is furthermore an object of the invention to provide a system allowing a requester user to transmit check copy requests to the financial institution and receive information back (e.g. the electronic check images) by means of a new method consistent with current telecommunications file transfer standards.

Brief Summary Text (30):
It is furthermore another object of the invention to provide a system having the ability to return electronic check images at the customer's request in the following ways:

Brief Summary Text (32):
b--by electronic batch request and batch return of files of check image requests and check images,

Brief Summary Text (36):
f--by all of the above ways of returning the image supported by an implementation of industry standard image formats with new features specifically designed to support the recipient's effective handling of individual electronic check images or arbitrarily large files of electronic check images.

Brief Summary Text (39):
It is yet still a further object of the invention to provide a system having a user workstation where the user can review and maintain the local database of check images within the constraints of the possibly limited local disk space available to industry standard office automation and computer workstation environments.

Brief Summary Text (40):
It is yet still a further object of the invention to provide a system having the ability to create reports and audit records of all check image related events at the requester workstation level.

Brief Summary Text (43):
As is evident from the above description of current check processing system, a highly sophisticated problem is presented when copies of hundreds or thousands of checks

requested by a customer or customers need to be processed by a banking institution and the need arises to verify the check information. The system described herein provides a solution to this problem. For example, the inventive system can accomodate all the check image requests generated at today's largest check processing institutions on their peak days.

Brief Summary Text (45):
The system of the invention includes an electronic host archive storage and retrieval system for storing and retrieving copies of checks or check images. This host archive system is linked via a communications link, e.g., modems and telephone line, to one or more generally remotely located customer workstations.

Brief Summary Text (48):
In the invention, use is made of multi-tasking and multi-windowing environments such as Microsoft Windows.TM. or IBM OS/2.TM. to provide a graphical interface for the system of the invention that the operator uses to interact with the retrieved check image copies.

Brief Summary Text (51):
After a predetermined processing time to retrieve and sort the check images, the workstation operator can initiate a download or file transfer from the host archival system. The host system will transfer a front image and a separate back image for each check.

Brief Summary Text (52):
Each check image has the MICR line information embedded in the check image file for identification. The identification information contains the account number, the check number, amount and date of the check.

Brief Summary Text (53):
Once downloaded to local storage of the workstation, the system software resident at the workstation will read the data stored within each check image file to obtain the account number, check number and amount of the check. When check images are received at the local workstation, the system software will correlate the check request entry with the check images. The filename of the check in the local database as well as a status field will be updated so as to indicate that the item has been downloaded, processed and received from the host archive system.

Brief Summary Text (54):
Once all of the downloaded check images have been processed, they are available for review by the operator.

Brief Summary Text (55):
According to the invention, an operator can select a menu item to present a Select/Display screen at the workstation that lists alpha-numerically the downloaded checks and those requests for check download which are pending. On this Select/Display screen, an operator has the option to sort the check images by account number/check number, amount, a user reference number, status and date. Status indicates whether the item is Pending, Received or Exported. A pending item is a request that has been sent or uploaded to the host archive but not yet downloaded. A Received item is an item that has been downloaded to the workstation, processed and is ready for viewing. An Exported item is a check image that has been downloaded to the workstation but not requested. According to the invention, a customer has an option of indicating if it wants all check images sent to the workstation (exported) without the need to request each image specifically.

Brief Summary Text (56):
Preferably, according to the invention, an operator may click with a mouse or other pointer device to select an item indicated on a screen display of the workstation or select an item for viewing by using cursor arrow keys of a computer keyboard and striking the enter or return key. Once selected, the system will read the file names for the front and the back of the check images. The system of the invention preferably will read and display the front and back check images into a separate window for each check image. The separate windows for each front and back check image are referred to herein as a check-centric display interface. This check-centric display optimizes

(i.e. minimizes) the amount of time a user would have to search for information on the check images.

Brief Summary Text (57):
According to the invention, the front of the check may be displayed in maximum width horizontally in the left window. The back of the check then may be displayed in the right window vertically and enlarged to display the endorsement section. The endorsement section of a check is the section where a payee would indicate its account number and signature or endorsement stamp. This feature saves the operator from rotating the check image vertically in order to read the endorsement. At this point, an operator has the option of manipulating the check image to enhance the readability of the information.

Brief Summary Text (59):
According to the invention, a facility to highlight a specific area of a check image has been provided for fast enlargement. This facility allows an operator to zero in on specific information and enlarge it so it is more readable to the human eye.

Brief Summary Text (61):
In addition to the Select/Display screen to select a specific check, the system preferably has two navigation buttons located at the bottom of the screen. One button is a graphical representation of an arrow facing down to move forward through the local database of check images. Another button is a graphical representation of an arrow facing up to move backward in the local database of check images. Once the operator operates these navigation buttons, the system will automatically display next/previous check images in a default order (account number and check number) or any other order specified by the user. These navigation buttons allow an operator the ability to quickly review the downloaded check images. This is a significant improvement over manually handling physical paper checks.

Brief Summary Text (63):
Further according to the invention, a database maintenance facility is provided to manage downloaded check images. The invention provides a configuration parameter to indicate when a check image should be listed in the database maintenance screen. This configuration parameter is used to indicate the threshold number of calendar days before a check image should be included in a database maintenance screen report. Each downloaded check image is stored locally at the workstation.

Brief Summary Text (64):
It is conceivable that at some point in time the check images available for downloading will exceed the amount of physical storage space available at the workstation. An operator can select the database maintenance option to purge or physically delete check images and the corresponding database record. An operator preferably has two options according to the invention: one is to select a check individually for deletion and the other is to delete all the check images and entries that appear in the database maintenance screen.

Brief Summary Text (65):
A facility to copy the front or back check image to a temporary storage area, e.g., a Microsoft Windows.TM. clipboard, is provided. The ability to share the image with other desktop applications improves the operator's ability to create correspondence or additional documentation in today's office computing architecture.

Brief Summary Text (66):
According to the invention, a facility to incorporate the check images into customer correspondence is preferably provided. An operator may select a document template that is created with an industry available word processing package. The document and check images are merged along with address information of the recipient (payee) to create a document that can be sent to the payee to confirm that the check was received by the payee and paid. An operator may print out the document to send to a payee via conventional mail delivery service such as the Postal Service. However, if the system software is installed on a workstation that supports outgoing fax services via modem communications, an operator may fax the correspondence directly to a payee's fax machine. This automated correspondence processing represents a significant improvement in the time it takes to prepare correspondence and send it to a payee.

Brief Summary Text (72):
According to the preferred embodiment, the document comprises a check and the step of placing a request for a document image comprises entering an account number and a check number for the requested check.

Brief Summary Text (81):
According to the preferred embodiment of the invention, the step of generating an index record comprises generating the decoded magnetic ink coded data for each check and a BLOB pointer to the BLOB containing the image of a particular check.

Brief Summary Text (83):
According to the preferred embodiment of the invention, the step of searching the electronic storage device for the requested electronic image comprises searching the index database by using the account number and check number of the requested check, thereby determining the BLOB containing the image of the check, and using the determined BLOB pointer to find the check image in the electronic storage device.

Brief Summary Text (88):
In the preferred embodiment of the invention, the document is a check having two sides, and wherein the step of displaying the requested electronic image comprises displaying an image of each side of the check.

Brief Summary Text (91):
According to the preferred embodiment, the invention further comprises providing user operated controls to allow selected ones of enlarging and reducing the size of the displayed images of the front and back sides of a check, rotating the images to improve readability and scrolling through the images.

Brief Summary Text (93):
According to the preferred embodiment, the invention further comprises providing the user defined reference field back to the user at the user interface device to enable sorting of check images according to the user reference field.

Brief Summary Text (94):
According to the preferred embodiment, the invention further comprises sorting the check images provided to the user interface device from the electronic storage device by at least one of account number, check number or amount.

Brief Summary Text (96):
Thus the invention provides solutions to the problems of customer service regarding processing of requests for copies of checks and delivering copies of checks to customers by providing an all electronic check image requesting, retrieval and delivery system.

Drawing Description Text (3):
FIG. 1 is a block diagram which gives an overview of the electronic check image storage and retrieval system including a check image archive (host) system and a plurality of customer service workstations or check image stations;

Drawing Description Text (5):
FIG. 3 is a more detailed block diagram of part of the host system and the manner in which check images are made and queued in the host archive system;

Drawing Description Text (7):
FIG. 5 is a more detailed diagram of one embodiment of part of the host system showing how check images are stored in/retrieved from the mass storage device of the host archive system;

Drawing Description Text (8):
FIG. 5A shows the normal and repass processing employed by the check reader/sorter device utilized in the invention to generate check images and data;

Drawing Description Text (9):
FIG. 5B shows further process steps used in the invention to store check images;

Drawing Description Text (12):
FIG. 5E shows how a check image is recovered by the host system;

Drawing Description Text (19):
FIG. 8 shows the front and back check image window screen;

Drawing Description Text (22):
FIG. 11 shows the Select/Display Check Images screen containing a plurality of check items;

Drawing Description Text (25):
FIG. 14 shows a screen which is employed in generating correspondence with a client incorporating the check images;

Drawing Description Text (28):
FIG. 17 shows the front and back check image screens showing the front and back image of a representative check;

Drawing Description Text (29):
FIG. 18 shows the check image screen with a pop-up window showing the options under the View option of the top level menu;

Drawing Description Text (30):
FIG. 19 shows the use of the highlight and enlarge facility of the system showing how check images can be highlighted and thereby enlarged by the user on the screen, as well as showing the rotate facility in the "BACK OF CHECK" window;

Drawing Description Text (35):
FIG. 24 shows the Customer Information screen employed in entering document header data to be inserted into documents incorporating check images that are sent to a client;

Drawing Description Text (38):
FIG. 27 shows the overall flow process of creating requests for checks at a workstation, retrieving check images, downloading the images to the workstation for display, and creation of correspondence incorporating the check images to be sent to a customer;

Drawing Description Text (40):
FIG. 29 depicts the communication protocol used between the host system and a customer workstation for downloading check images.

Detailed Description Text (3):
Referring now to the drawings wherein like numerals indicate like elements, FIG. 1 is a block diagram of the overall electronic check image storage and retrieval system according to the present invention. The system comprises a check image archive system 8, also known and referred to herein as the host system 8, and at least one customer workstation 7, also known and referred to herein as an image station 7. Preferably, there are a plurality of workstations 7. The workstations 7 may be remotely located from the host system 8 and also from each other.

Detailed Description Text (4):
The host system 8 includes at least one sort station 2, which preferably is a check imaging and sorting machine and a controller, as known in the art. Sort station 2 receives checks 1, generates digital images of the checks, decodes the MICR line of each check and sorts them to one of a plurality of pockets, to be described in more detail below. The sort station 2 is coupled to a host system communication link or network 3 such as a LAN, WAN or bus, as known in the art. Also coupled to the network 3 are at least one repair station 4, an image storage station 5 and an output station 6. The repair station 4 is provided to permit checks which have not been normally processed to be repaired, i.e., to have any errors in the decoded MICR corrected, as explained more fully below. The image storage station 5 includes a digital mass storage device, to be described in greater detail below, which stores digital images of the checks generated by the sort station 2 as well as identifying information to

enable the images to be retrieved. The output station 6 controls communication and transmissions between the host system 8 and the customer workstations 7 and provides data comprising the digital images of the checks and check identifying data to the customer work stations 7 on request. Additionally, the output station 6 provides other output, including, for example, tape, CD-ROM and/or WORM output of electronic check images for the bulk export of check images. These components of the host system 8 will be described in more detail below. As will be evident, more than one sort station 2 can be provided to improve throughput. Similarly, a plurality of repair stations 4, image storage stations 5 and output stations 6 can also be provided.

Detailed Description Text (6):
The export station 610 of the output station 6 includes a bulk export controller 611, which is preferably coupled to at least one device capable of exporting, or providing as an output, a large amount of data comprising digital images of checks processed by the host system 8. In accordance with this capability, bulk export controller may be coupled to a digital storage device such as a tape drive 612, CD-ROM recorder 613, WORM drive 614, and/or any other suitable device.

Detailed Description Text (7):
Each customer workstation 7 includes a workstation computer 701 and a display device 701A for displaying check images and other screen information. The computer 701 is coupled to a local storage device 702. The workstation computer 701 is also preferably coupled to a printer 703 for printing images of checks as well as other documents incorporating check images, for example.

Detailed Description Text (9):
The output controller 602 is coupled to output queue device 601 and the network 3. According to the preferred embodiment, the output controller 602 may be a SUN SparcStation 2. The output queue device 601 may be a RAID disk array. The device 601 is provided for the storage of customer, user and account information and temporary storage of check image requests and check images requested by one or more of the workstations 7 and which are to be downloaded to one or more of the workstations 7. As described, the communication gateway 603 preferably includes a plurality of modems 604, one or more ISDN controllers 605 and/or other communication equipment to form a suitable communication link 11 to provide requested check images to one or more customer workstations 7 located at the customer sites or elsewhere.

Detailed Description Text (10):
The bulk export controller 611 of the export station 610 may provide output to devices to deliver check images and other data to customers in mediums other than by on-line communication. For example, the bulk export controller may write check images and data to the tape drive 612, the CD-ROM recorder 613 or the WORM drive 614 or on any other suitable media or for transmission by any other means. The export station 610 is useful for the large scale delivery or transmission of check images to customers who must process requests for large numbers of checks or who require, for example, that all checks paid by them be provided to them.

Detailed Description Text (13):
With reference to FIG. 3, checks 1 are fed into input hopper 203 of the sorter 200. The checks 1 are then conveyed along the track 220 sequentially to digital imager 204 and MICR line reader 205. The check images made by the imager are passed to the Optical Character Recognition device (OCR) 206. After the MICR line is decoded by station 205, the checks 1 are passed to one of the eight output pockets, i.e. the repair pocket 208, the repass pocket 209 or one of the six normal sort pockets 210. Checks 1 that are routed to the repass pocket 209 are again placed in the input hopper during the repass run of the sorter 200. During the repass run, checks 1 are manually placed in the input hopper 203 as shown by dashed lines 207, processed to the repair pocket 208 (described in greater detail below), one of the six normal pockets 210 or killed (removed from processing). According to the preferred embodiment, the sorter 200 may be an NCR 7780 check reader/sorter, which processes approximately 370 checks/minute.

Detailed Description Text (14):
The control computer 201 controls the operation of the sorter 200. The control computer 201 may be an NCR 486 type computer or any other suitable device. Storage

device 202 is operatively coupled to the control computer 201, as is the network 3. In the preferred embodiment, the storage space 202 may be a RAID disk array. In the preferred embodiment, the array 202 may comprise three disks of about one gigabyte each. The amount of storage space is not crucial. Enough must be provided to serve its purpose, which is to provide temporary storage of check images and associated data before the images are provided on the network 3. Additionally, the storage device 202 is useful to queue check images when processing in an off-line mode, storing checks without transmitting the check images across the network 3. This is useful especially if the network 3 goes down, and it is still desired to continue the operator intensive check sorting and processing function implemented by the sorter 200 and store the resultant images.

Detailed Description Text (15):
Generally, to process a check 1, it is fed into the input hopper 203 of the sorter 200. The check 1 is transported along the mechanical track 220 and reaches the imager 204 which generates digital images of the front and back of the check 1. The digital image of at least the MICR line of the check 1 is passed to the OCR device 206 which, through optical character recognition, decodes the MICR characters optically from the image. When the check 1 reaches the MICR reader 205, the MICR is then magnetically decoded, as known in the art.

Detailed Description Text (16):
In accordance with the preferred embodiment of the invention, the digital images of the front and back of the check 1 are merged, by the control computer 201, into a single TIFF (Tagged Image F file Format) file 22. Additionally, the control computer 201 preferably merges the decoded raw MICR, a parsed MICR, th e customer ID, the work date, the processing date and time, a machine ID and a repair ID into the TIFF file 22 as tag fields. The control computer then stores the TIFF file 22 in queue 24, repair queue 25 of the storage device 202, or on storage space 505 (FIG. 5) of the image storage device. In a preferred embodiment, queues 24 and 25 are FIFO (first-in-first-out) queues.

Detailed Description Text (17):
FIG. 4 shows the repair station 4 in greater detail. The host system network 3 is coupled to a repair controller 401. The repair controller 401 is coupled to a display 402 and a keyboard 403. The repair station 4 is provided for an operator to repair data associated with check images prior to storing the image for customer retrieval in the host system 8.

Detailed Description Text (18):
FIG. 5 shows one embodiment of the image storage station 5, containing the check image mass storage device, in greater detail. The host system network 3 is coupled to a storage space 505 via an image storage controller 501. The image storage controller 501 is also coupled to an image storage device 502. The image storage device 502 preferably is a mass storage device, e.g., a Kodak 6800 optical jukebox. The storage space 505 is provided for temporary storage to maintain administrative data (or meta-data) for the image storage device 502. The network 3 is also coupled to an index database controller 510. The index database controller 510 is coupled to an index database device 511. In the preferred embodiment, the image storage controller 501 and the index database controller 510 may be Sparcstation 20 computers manufactured by SUN and the index database device 511 may be a RAID disk array.

Detailed Description Text (28):
The control computer 201 is coupled to the sorter 200 and interfaces with the network 3. The control computer 201 controls the functionality of the sorter 200 and converts the front and back check image and the MICR line, as decoded by the sorter 200, into a single TIFF file 22. Once complete, the TIFF files 22 are written to storage space 505 (FIGS. 5 and 5I) for later storage by the image storage controller 501. Due to its direct connection to the control computer 201, however, storage space 202 is intended to function as the site for TIFF file 22 storage in the event that the network 3 is temporarily not functioning. With this configuration, the operator intensive work, e.g. processing of checks 1 through the check sorter 200, can proceed without interference in the event of a network 3 problem, and the TIFF files 22 can later be written to storage space 505.

Detailed Description Text (29):
The sorter 200 decodes the MICR line of each check. For each check with a successfully decoded MICR line, front and back digital images of the check and other data generated by the sorter 200 are converted into a single TIFF file 22 for each, and stored in the storage space 505. Where the MICR line is not successfully decoded, however, and less than a predetermined number of errors are present, the digital images and data requiring repair are sent to a repair queue 25 of the storage space 202. Repair station 4, which will facilitate repair of questionable or incompletely decoded MICR data from the sorter 200, obtains its input from the repair queue 25. This is accomplished via a suitable network connection, preferably an NFS mount, between the control computer 201 and the repair station 4. Where more than predetermined numbers are present, the images and data are discarded.

Detailed Description Text (37):
In the preferred embodiment of the invention, the imager 204 generates digital images of the front and back of each check using a pair of cameras (not shown), as known in the art, which convert the analog image data of the front and back of the checks into digital image data.

Detailed Description Text (39):
As in any character recognition operation, especially one employing mechanical movement of documents, errors can be introduced into the process. A common problem in check processing is when two checks 1 pass down the track 220 at the same time, commonly referred to as a piggy-back. In a standard check processing environment, this could result in the second check being missed by the check sorter. In an image capture environment, this situation will result in the front image of the first check being associated with the back image of the second check.

Detailed Description Text (40):
In addition, a more significant problem results from the information extracted from the MICR line being incorrect. An example of these problems is where a MICR line read error results from the second check's MICR line information "bleeding" through the first check, resulting in incorrect information being received by the MICR reader 205. Thus, the check image would be stored in a storage device under an incorrect account number, making it, for all practical purposes, unretrievable.

Detailed Description Text (41):
In order to identify this situation and take corrective action while the checks 1 are still in the sorter 200, a "best read" comparison is performed on the data retrieved from the MICR line prior to making the decision relating to which of the output pockets 208, 209, 210 to send the check 1. As is well known in the art, in character recognition, whether optical or magnetic, an algorithm determines what character is represented to a given confidence level. Below that confidence level, the algorithm will not determine what the character is. A "best read" is determined by the sorter 200, from the results of the decoded MICR from the OCR 206 and the MICR reader 205, in accordance with a known technique, not described in detail here. In the preferred embodiment, the check sorter 200 is instructed to provide a "best read" on the MICR line, and returns a decoded MICR line with "!" characters replacing any questionable data in the MICR line. If the "best read", i.e., the decoded MICR line contains no "!" characters, the control computer 201 causes the check image to be converted to a TIFF file 22 and directs the check to one of the six normal output pockets 210. The front and back check digital images are converted from the camera digital image format, e.g., NCR image format, into a standard Tagged Image File Format (TIFF, which is a registered trademark of ALDUS Corp.) The front and back digital images are combined into a single TIFF file 22 along with other data, described below, relating to the check and its processing. The TIFF file 22 is in industry standard TIFF format. The non-image data is given TIFF tags and stored within the file as financial information. The following fields are each stored as tag fields:

Detailed Description Text (46):
Where "best read" contains "!" characters, the number of such characters is compared with a threshold number (260). Checks 1 containing some "!" characters, but fewer than the threshold level, are sent to the repair pocket 208 (see 261) and the associated image for that check is sent to a repair queue 25 (see 262). Checks 1 with an equal or a greater number of inconsistencies than a threshold number are sent to a repass

pocket 209 (see 263) and the associated image is discarded. In a preferred embodiment, the threshold number of "!" characters, or errors, is four, meaning that if there are four or more errors, or unreadable characters, the check is sent to the repass pocket. Normal processing continues until there are no more checks 1 in the input hopper 203 (see 214), at which time normal processing is complete (265).

Detailed Description Text (48):
In repass mode, checks in the repass pocket 209 are moved to the input hopper 203 and again conveyed along the track 220. A "best read" is again obtained for the check. The repass mode differs from normal processing only in the way checks are handled if a threshold number or more errors are present. If the number of errors is equal to or greater than the threshold for this second processing, the check is stopped in the track 220 and the image is displayed on the console 211 along with the decoded MICR line (see 271). The operator can decide to accept the check 1 (see 272), which causes the check 1 to be guided to the repair pocket 208 (see 261) and the image is sent to the repair queue 25 (see 262), to facilitate later correction at the repair station 4. The operator can also decide to reprocess the check 1 on the sorter 200 (see 275), at which time the operator removes the check 1 from the track 220 and places it in the input hopper 203 (see 276). The image and data associated with that check 1 are then discarded (see 264). If the operator chooses not to accept (272) or reprocess (275) the check 1, the check must be killed by removing the check from processing (step 278). The image and data associated with that check 1 are also discarded (see 264). A check 1 is killed if, for instance, the check 1 is for an account other than the account currently being processed. When the operator chooses to kill a check, the number of expected checks and the dollar total of the expected checks will be reduced appropriately. Repass processing continues until there are no more checks 1 in the repass processing pocket 209 (see 214), at which time repass processing is complete (265).

Detailed Description Text (55):
The processing followed by the repair station 4 facilitates rapid correction of a large volume of MICR lines. With reference now to FIG. 5F, once initiated, the repair station 4 automatically searches the repair queue 25 of storage space 202 for items needing repair (140). Preferably, the system follows FIFO logic, by account, for presenting items requiring repair to the operator. The check image and partially decoded data for each item requiring repair is presented to the operator (142).

Detailed Description Text (65):
The repair screen 179 (FIG. 5H), generated by the repair controller 401 on the display device 402, displays both the front 182 and back 180 image of the check, along with three fields showing the account number 186, check number 188 and amount 190. As mentioned above, a single input field 192 is present on the repair screen 179. Preferably, the back image 180 of the check is displayed on the top of the screen since it is the image least relevant to the repair task. The front image 182 of the check is displayed below the back image 180. Directly below the front image, and aligned with the displayed MICR line 184 are the account number 186, check number 188 and amount 190 fields. The data fields show the values of the three fields as determined by the sort station 2. Alignment with the actual MICR data 184 aids in rapid identification of necessary corrections. The repair function highlights the field being worked on by showing the data in reverse video. At the very bottom of the screen, directly under the three data fields 186, 188, 190, is the single data entry field 192 by which the operator enters the new data for correcting the incorrect data, as described. By utilizing a single data entry field, the operator can focus attention on one location on the screen and avoid wasting time searching the screen for the next area of the screen requiring attention.

Detailed Description Text (67):
With reference now to FIG. 5 and 5I, which show two alternative embodiments of the image storage station 5, the TIFF files 22 are stored on an image storage device 502, which preferably comprises a mass storage device. Further, the image storage station runs a pair of asynchronous processes, described below, the Requester Process and the Retrieval Process, to process incoming requests for check images from a customer workstation 7. In a first embodiment, shown in FIG. 5I, the image storage station 5 comprises an image storage controller 501 coupled to the network 3, an image storage device 502 and a storage space 505. In a second embodiment, shown in FIG. 5, the image

storage station additionally comprises an index database controller 510 coupled to the network 3 and an index database device 511.

Detailed Description Text (71):
A customer desiring a check image can cause a workstation 7 to transmit a request file to the host system 8. The operation of the workstation 7 and creation of requests will be described in greater detail below in connection with the detailed description of the workstation. The request file from the workstation 7 is stored on the output queue device 601 (FIG. 2) until it can be processed. The following is a description of request file processing.

Detailed Description Text (72):
Generally, a request file can contain a request for one or more check images. When a requested check image is found, it is queued on the output queue device 601 for later transmission to the customer workstation 7.

Detailed Description Text (75):
The Retrieval Process reads requests from the request data structure and retrieves the check image files, depositing them in the appropriate user's download directory on the output queue device 601 of the output station 6.

Detailed Description Text (76):
With reference both to FIGS. 5 and 5I, TIFF files 22 containing front and back check images and the embedded MICR line and optionally other data are written to the storage space 505, as described above, by the sort station 2 and the repair station 4. The TIFF files 22 awaiting processing by the image storage controller 501 are maintained on the storage space 505 in a round robin directory structure described above. The image storage controller 501 archives the TIFF files 22 to the image storage device 502 where they can be found and retrieved by the Requester Process and the Retrieval Process.

Detailed Description Text (85):
In a first embodiment (FIG. 5I), in order to spread out the files over as many directories as necessary to maintain satisfactory response time, preferably each account is given a separate directory. Although the check images, and therefore the TIFF files 22, in the host system 8 can be uniquely identified by account number, check number and optionally check amount, only part of this information is used in the above algorithm. Preferably, a subdirectory exists for each account for which check images are to be archived. The check number is used, according to the above algorithm, to return segments used for the path within the account directory, and as part of the file name. The amount is appended to the last segment returned by the algorithm to create a file name. Thus, check number 123456 in the amount of $222.22 drawn on account 33333 would have a path and file name, pictorially shown, of:

Detailed Description Text (97):
With reference to FIG. 5C, a Requester Process is generated (spawaned) on the image storage controller 501 by the output controller 602 for each request file on the output queue device 601. The Requester Process writes each check image request therein to a request queue on the image storage controller 501 in order to serialize the individual check requests. See step 90. In the illustrative embodiments, the request queue is a UNIX FIFO queue. The Requester Process reads (92) the request queue in a FIFO fashion, and processes each request independently.

Detailed Description Text (98):
The Requester Process analyzes each check image request in the request queue to determine whether or not one or more TIFF files 22 corresponding to that request, is present on the image storage device 502. The Requester Process uses the algorithm, as described above, to turn the account number, check number and amount into a path and file name of one or more TIFF files 22 which satisfy this request (93). If the amount of the check is not present, a wildcard search, as known in the art, can be performed. If the TIFF file 22 exists, the meta-data on storage space 505 can be interrogated to determine the platter upon which the TIFF file 22 is present. For each request for which a TIFF file 22 is located (94) an entry is inserted in a request data structure specifying the location of the TIFF file 22 which will satisfy the request (98). For example, the path and file name, along with the platter location (volume and side) are

passed to the Retrieval Process via a request data structure. Preferably the request data structure comprises the following fields: volume; side; priority; username; customer name; request date; request time; account; check number; check amount; and request number (in batch).

Detailed Description Text (100):
If no TIFF file 22 can be located for a particular check request (94), the Requester Process places the request into the request data structure corresponding to the "not found" directory (96), in other words, specifying the location of a "Check Not Found" image.

Detailed Description Text (103):
In order to minimize platter thrashing, all requests are sorted for retrieval. Preferably, the request data structure is set up to have sortable fields corresponding to the physical characteristics, e.g., platters and sides, of the image storage device 502. Since the Requester Process has determined the location for each request, the Retrieval Process simply sorts all of the requests by platter and then by platter side. The Retrieval Process first checks if there are check image requests pending for the platter currently in the drive (1118). If there are, the Retrieval Process then checks to see if there are any requests for the side of the platter currently under the read heads of the optical storage device (1120). If there are no requests for the current side, the platter is then flipped (1124).

Detailed Description Text (105):
If the user is not authorized, or if the account number selected is not in the valid accounts file, the Retrieval Process will generate a "Check Not Found" check image to return to the user (1116), thus not giving any further information to anyone trying to access an account for which they have not been authorized.

Detailed Description Text (108):
The TIFF file 22 contains images of both the front and back of the check, as well as tagged data fields containing the raw MICR line, the parsed MICR line, the account number, the check number, the amount, and the customer ID. The Retrieval Process generates two TIFF format files from this TIFF file 22: one comprising the front image (the ".f file") and one comprising the back image (the ".b file") of the check. As discussed above, TIFF tags are utilized to store descriptive data about the check directly in TIFF files 22 and the TIFF format .f and .b files. The MICR line and all of the other non-image tagged data fields are placed in both files. This information may be used by the customer workstation 7 to identify each file and match the .f and .b files to the specific request. The front image file and the back image file preferably are named utilizing a sequential number scheme to insure uniqueness. The file name extensions may be used to identify front (.f) and back (.b).

Detailed Description Text (109):
All generated "Check Not Found" files are in the TIFF format as well, and contain the requested account number and check number of the check requested. If amount was specified in the request, preferably it too is placed in the "Check Not Found" file if the image was not found. This ensures consistent processing in identifying this image file with the request on file at the customer workstation 7.

Detailed Description Text (113):
TIFF files 22 containing both front and back check images and the non-image tag data are written to the round robin directory structure on the storage space 505 coupled to the image storage controller 510, as described above, by the sort station 2 and the repair station 4. The rate at which these files are created, and therefore become ready for storage, may be greater than the rate at which the individual TIFF files 22 can be indexed and stored by the image storage station 5.

Detailed Description Text (120):
According to the algorithm described above, the sequence number is used to determine a path and file name on the image storage device 502 at which to store the BLOB 26. The image storage controller 501 then writes the BLOB 26 to the image storage device 502 under the path and file name determined. After the write function has been successfully completed, the image storage controller 501 sends the account number for the the check images stored in the BLOB 26, along with the check number and amount

associated with each of the TIFF files 22 and the sequence number of the BLOB 26 in which they were stored, to the index database controller 510.

Detailed Description Text (126):
With reference to FIG. 5C, a Requester Process is generated (spawned) on the image storage controller 501 by the output controller 602 for each request file on the output queue device 601. The Requester Process writes each check image request therein to a request queue on the index database controller 501 in order to serialize the individual check requests. See step 90. In the illustrated embodiment, the request queue is a UNIX FIFO queue. The Requester Process reads (92) the request queue in a FIFO fashion, and processes each request independently.

Detailed Description Text (127):
The Requester Process performs a search of the index database 30 for each check image request in the request queue to determine whether or not an index record exists corresponding to that request, and thus, the check image is present on the image storage device 502. Where the check image is present, the Requester Process obtains its location e.g., a BLOB pointer 36 and passes this information to the Retrieval Process via the request data structure. Preferably the request data structure comprises the following fields: volume; side; priority; username, customer name; request date; request time; account; check number; check amount; request number (in batch); and the sequence number of the BLOB 26 in which the TIFF file 22 exists.

Detailed Description Text (128):
For each check image request, to determine whether a corresponding TIFF file 22, and therefore a check image is present on the image storage device 502, the Requester Process queries the index database 30 (93). Preferably, for each request for which an index record 28 is located, the meta-data on storage space 505 is interrogated to determine the platter and side upon which the BLOB 26 containing the corresponding TIFF file 22 is located (93). If an index record is found (94) an entry is then inserted in the request data structure specifying the location of the BLOB 26 containing the TIFF tile 22 which will satisfy the request (98). In the case where more than one index record 28 is located to satisfy a particular request, for example, where two checks have the same account and check numbers and no amount was specified in the request, an entry in the request data structure is made for each index record 28, and thus TIFF file 22, that satisfies the request (98).

Detailed Description Text (129):
If no index record 28 is found for a particular check request (94), the Requester Process places the request into the request data structure corresponding to the "not found" directory (96), in other words, specifying the location of a "Check Not Found" image.

Detailed Description Text (135):
The output controller 602 is also coupled to the output queue device 601. The output queue device 601 is used to store customer, user and account information, check requests transmitted by customers, and check image files that are to be automatically downloaded to customers' workstations 7 via the communication gateway 603 mentioned above. In the preferred embodiment, the output queue device 601 may be a RAID disk array.

Detailed Description Text (138):
The Export Station 610 controls bulk export of check images. For example, check images can be sent to clients on a periodic cycle, e.g., daily, weekly, monthly, etc. A variety of export media are available, for example, CD-ROM and digital tape.

Detailed Description Text (139):
The bulk export controller 611 is linked to the Network 3 and one or more recording devices, such as a CD-ROM recorder 613, a tape drive 612 or a worm drive 614. Check images can be recorded, using the recording devices (612, 613, 614), for forwarding or archival purposes. The check images recorded for forwarding to a customer are in the form of .b (back) and .f (front) files, discussed below.

Detailed Description Text (140):
The Export Station 610 controls all physical devices for media output, i.e., output to

CD-ROM, tape or other media. Export of check images via electronic transmission are controlled by the output controller 602. Each output media necessitates different data preparations, as are known in the art. The Export Station 610 controls these preparations.

Detailed Description Text (145):
Check images are uniquely identified by account number, check number and optionally amount. These three fields comprise the key to a single check/single file implementation. Performance limitations of the mass storage device, and in particular, the optical jukebox used in the preferred embodiment, make a single check/single file implementation infeasible for the present system. An optical jukebox is preferably used in the invention in order to provide large amounts of cost effective storage. Thus, a new implementation, i.e., multiple check/single file system, is provided by the invention.

Detailed Description Text (147):
Individual check image files (TIFF files 22) are grouped in batches (BLOBS 26) prior to being written to the image database 503 on the image storage device 502, thus effecting a multiple check/single file database. In accordance with the invention, by grouping, for example, fifty check image files (TIFF files 22) into a single larger file (BLOB 26) of approximately 1 MB, write time to the device 502 is reduced from approximately 20 seconds down to approximately 2 seconds.

Detailed Description Text (150):
The host system 8 has now been described. The following description relates to the structure and function of a customer workstation 7, used by a customer to request and retrieve check images from the host system 8.

Detailed Description Text (152):
In the preferred embodiment, each workstation computer 7 is a Microsoft Windows.TM. based system that allows users to request, receive, and display images of checks that have previously been captured and stored in the above described host system 8. It will be apparent to one of skill in the art that the described workstation software can be written for any window based or non-window based operating environment, and reference herein to the functionality of the workstation software as it pertains to Windows.TM. is merely for convenience. Furthermore, it is understood that the organization of the functions, menus and sub-menus of the workstation software was designed with the Windows.TM. operating environment in mind, and can be easily modified to accommodate and/or take advantage of any operating environment upon which one of skill in the art would implement it.

Detailed Description Text (153):
As already described, the host system 8 captures and stores images of checks for the customer's designated accounts and maintains them in an archive for up to seven years or more. Workstation software resides on the local storage device 702 and is accessible to the workstation computer 701. The workstation software allows the user to initiate requests for check images, download those images to the customer workstation 7, and view or print the downloaded images as desired. The workstation software also provides utilities to assist the user in managing the number of images retained on the local storage device 702. In addition, if the user has a word processor, for example, Microsoft Word.TM. or any other suitable word processing software, available to the workstation, the workstation software can be configured to allow automatic insertion of check images into pre-defined word-processing documents.

Detailed Description Text (154):
In a preferred embodiment, the workstation software provides all communication, logon, file transfer, display, and print capabilities the user will need to request, receive, display, and print the check images.

Detailed Description Text (167):
After startup, the general methodology for requesting and retrieving check images from the Workstation consists of the following general processes, as shown in the block diagram of FIG. 27.

Detailed Description Text (175):

8. Optionally merging the check images into a word processing template (1214); and

Detailed Description Text (176):
9. Optionally printing a letter comprising the check images (1216).

Detailed Description Text (178):
The local storage device 702 provides for storage and retreival of information relating to the workstation 7 operation. Preferably, the local storage device 702 has a default directory 702A which stores the workstation software, data files used by the workstation software, and .f and .b files as they are received. The storage device 702 also has an image directory 702B for storage of .f and .b files (front and back check images) once they have been processed by the workstation software. Preferably, the image directory 702B is a sub-directory of the default directory 702A.

Detailed Description Text (179):
The main data file 710, the account data file 715, the request file 720 and the service mode file 725 are all preferably stored in the default directory 702A. The main data file 710, for example in dBase format, preferably comprises a record 711 for every check image stored in the image sub-directory 702B and for each check request which has been entered by the user. The account data file 715 is used to store all of the current accounts, and the service mode file 725 is a list of available service modes, e.g., Overnight and Same Day. The request file 720 contains the most recently compiled list of requests for transmission to the host system 8, whether or not it had been transmitted.

Detailed Description Text (180):
To free disk space on the local storage device 702, the Options/Image File Maintenance procedure described below removes both unwanted check images and their associated references in the main data file 710. The database schema for each record 711 in the main data file 710 is reproduced:

Detailed Description Text (209):
Enter Check Request . . . Allows the user to enter data necessary for requesting a check image.

Detailed Description Text (211):
Get Images From Chase . . . Allows the user to retrieve check image files corresponding to the transmitted check requests from the host system 8.

Detailed Description Text (212):
Select/Display Check Image . . . Allows the user to select a check image from all those resident in the user's hard disk and display that image on the screen.

Detailed Description Text (213):
Print Check Image . . . Causes the front and back of the check image displayed to be printed.

Detailed Description Text (216):
Copy Copies the check image in the active window to a temporary storage area, e.g., the Windows.TM. clipboard.

Detailed Description Text (218):
Enlarge Check Enlarges the image in the window from which it was activated. Preferably function key F4 or the "+" key also enlarges the image.

Detailed Description Text (219):
Reduce Check Reduces the image in the window from which it was activated. Preferably function key F5 or the "-" key also reduces the image.

Detailed Description Text (225):
Next Check Using the presently selected sort order, displays the check image of the check following the displayed check. Preferably the key combination control-X also displays the next check.

Detailed Description Text (226):

Previous Check Using the presently selected sort order, displays the check image of the check preceding the displayed check. Preferably the key combination control-P also displays the previous check.

Detailed Description Text (232):
Select Document . . . Allows user to create a letter containing check images.

Detailed Description Text (233):
Options Permits selection of default mode, view or print, for letter containing check images.

Detailed Description Text (263):
Once the user has entered a check number 354, all the required information for requesting a check image is present on the screen: account number (default), check number, and class of service 358 (which defaults to Overnight). At any time that the required information is present, the request can be immediately added to the list by clicking the Add to List control button 400 or pressing a suitable keyboard key, e.g., Alt-A.

Detailed Description Text (301):
Similar to the File/Send Request File function, a "Dialing. Please Wait . . . " or similar message will be displayed while the connection is made to the host. The workstation now determines the amount of storage space available for the storage of downloaded check images. The connection may take upwards of 20 seconds to establish during which time a static-like sound may be heard from the modem 10. When the connection is made, a log-on is required, as discussed above for File/Send Request File (see FIG. 13). If no checks have yet been retrieved from the archive, the host system transmits a message to inform the workstation that no checks are ready to download, and the workstation software displays a "NO CHECKS READY TO DOWNLOAD" message. The download operation may be tried at a later time. If any checks have been retrieved and they are ready to download, the host system 8 calculates and transmits to the workstation 7 the check image files (.f and .b) ready to be transmitted. If this is greater than the amount of storage space available for storage of downloaded images, the workstation displays a message, indicating this to the user, and requiring the user to select an OK button. When the user selects OK, the workstation software proceeds directly to the Options/Image File Maintenance function. If, however, there is sufficient space, a message box describing the size of the download in kilobytes and number of checks as shown in FIG. 15 will appear.

Detailed Description Text (304):
(4) Select/Display Check Image--Print Check Image

Detailed Description Text (305):
These functions allow the user to select a check image from those resident on the local storage device 702 and display that image on the display 701A of the workstation 7, and optionally, to print the image on the printer 703. The display checks function is invoked by choosing the File/Select/Display Check Images menu option. The Select/Display Check Images Screen is shown in FIG. 11.

Detailed Description Text (308):
When the File/Select/Display Check Images screen first appears, the checks will be displayed in account number/check number sequence, as shown in FIG. 11. Using the sort buttons 450 at the top of the list, the checks may be re-sorted by Date (descending), Account number/check number, Check amount, User reference number, Status, or Date images were received from the host (ascending).

Detailed Description Text (313):
The front and back of the check will then appear in the display windows, as shown in FIG. 17. The following parameters are defined for the front and back check images: height, width, horizontal and vertical resolution, and horizontal and vertical scroll bars. The front of the check is displayed horizontally so that the full image appears in the window. The back of the check is positioned vertically and enlarged so the endorsement area is clearly visible. Associated with each front and back check image are the image height, width, horizontal and vertical resolution and horizontal and vertical scroll bars. The entire front of the check is displayed horizontally, to

permit the user to review the information thereupon easily, utilizing the maximum width of the sub-window for the front image. Preferably, only a portion of the back image is displayed. Specifically, the back image is rotated to cause the writing in the endorsement area to be readable normally to the user. The back image is enlarged to occupy, essentially the entire sub-window's width, thus, making the lower portion of the check image, which usually contains less important information, not initially present on the screen (see FIG. 17). With this check oriented display in mind, it can be seen that the position and size of the check sub-windows can be oriented in a number of useful ways. For example, the front image sub-window could be initially oriented to use the entire width of the main window with an aspect ratio similar to that of the check. The back image sub-window could be initially oriented therebelow, having an aspect ratio approximating that of the endorsement area. In the preferred embodiment, the sub-windows are resizable and the images are scalable, thus allowing great flexibility in the review of check images. Portions of the check image not appearing in the image sub-windows can be viewed by scrolling or panning the image within the window. The means for accomplishing these functions are known to those of skill in the art.

Detailed Description Text (316):
The Edit/Copy function allows the user to cop y the check image in the active window to a temporary storage area, e.g., the Windows.TM. Clipboard. The Windows.TM. clipboard is a utility application that acts as a temporary storage area permitting data transfer e.g. from one application to another. In the system according to the inventions, it is preferably supported by the workstation software to allow users to incorporate check images into other applications, particularly other Windows.TM. based applications. As discussed above, this function can also be accomplished using toolbar button D (see FIG. 9).

Detailed Description Text (318):
Once a check is displayed on the screen using, for example, the File/Select/Display function discussed above, the View function provides the ability to manipulate the displayed check images on the screen. The front and back check images may individually be enlarged, reduced, and rotated. The functions available under View are also available through the function keys, and the toolbars at the top of each display window.

Detailed Description Text (319):
In addition to the View sub-menu being available by selecting View from the top level menu, the same menu can be invoked as a pop-up window by clicking the right mouse button of the pointing device 701B anywhere within the check image sub-window. The View options are shown in FIG. 18.

Detailed Description Text (321):
Enlarge Check: This function enlarges the image in the active window. This operates the same as toolbar button E [(+)] (FIG. 9). Preferrably, function key F4 or the "+" key also enlarges the image. In a preferred embodiment, the image can also be enlarged using a graphical interface, for example, by dragging a pointing device (moving the pointing device 701B with the right button depressed) across a region of an image (see FIG. 19), whereupon that region is enlarged to fill the window. Preferably, where the aspect ratio of the region is not the same as the image sub-window, the region is enlarged so that it is the maximum size that will fit entirely within the image window. Programs for performing zoom type functions such as enlargement and reduction of graphical information, such as check images, are known in the art, and need not be discussed in detail herein.

Detailed Description Text (328):
Next Check: Using the presently selected sort order, this function displays the check image of the check following the displayed check.

Detailed Description Text (329):
Previous Check: Using the presently selected sort order, this function displays the check image of the check preceding the displayed check.

Detailed Description Text (342):
Default State: Sets the default state that will appear in the data input screen for

the header information of pre-defined letters which will incorporate check images. This is set by the installer to an initial default state. This value can be changed by the user whenever desired. To choose or change the state, as is customary in Windows.TM., the drop box, accessed by clicking on the down arrow to the right of the field, for example, may be used, thus permitting the user to scroll to and select the desired state.

Detailed Description Text (358):
When invoked, the Options/Image File Maintenance function lists all checks on the user's system older than a specific number of days on the maintenance screen (FIG. 23). The specific number of days is the Number of Days to Retain an Image (see FIG. 21) which may be set by the user using Options/Setup, as discussed above. The user may delete the .f and .b files, and any database references thereto for any, all, or none of the items on this list. The function is provided to permit the user to dispose of unneeded check images that are stored on the local storage device 702, thus allowing the user to prevent the local storage device 702 from running out of storage space. In another embodiment of the customer workstation 7, the .f and .b files could be deleted automatically when they reach a certain age.

Detailed Description Text (363):
Turning to FIG. 14, the Letter menu allows the user to select options which will insert the front and back of the check image into a pre-defined word processing template. In the preferred embodiment, Microsoft Word.TM. was chosen as the word processor. Any other suitable word processing function can be employed. As one of skill in the art will easily recognize, this feature may be implemented in Windows.TM. by taking advantage of the various operating environment tools designed to permit application programs to share information, such as DDE (dynamic data exchange) or OLE (object linking and embedding). Of course, this feature can be implemented without the use of these specific operating environment tools.

Detailed Description Text (365):
Choosing Letter/Select Document permits the user to create a pre-formatted letter incorporating the front and back images of a selected check. This option will initially present the user with the customer information screen (FIG. 24). Choosing the OK button from this screen will cause the workstation software to invoke the designated word processor, and proceed to create a letter within that word processor, and optionally print that letter. Choosing the Cancel button will return the user to the previous screen.

Detailed Description Text (369):
Once a template is selected, the workstation software will cause the word processing software to be invoked, loading the selected document into the word processor, and inserting the header information (FIG. 24) and front and back check images into it (FIG. 25). If the View option is selected (described below), the document can then be edited and printed as any other word processed document. If the Print option is selected (also described below), the document is printed prior to being editable in the word processor. Finally, the user may exit the word processor in the customary way, and, as will be understood by one of skill in the art, the user must take care not to save the letter under its pre-defined name. If the operator desires to save the just created letter, it can be saved under another name, as the operating environment and word processor permit, for example by using the File/Save As function in Word to give it a new name.

Detailed Description Text (381):
To create a pre-formatted letter, a normal document must be created in Word.TM.. To position the data from the input screen and the check image itself, the following bookmarks (spelled exactly as shown below) should be inserted in the desired locations:

Detailed Description Text (392):
g. Requesting Check Images

Detailed Description Text (393):
The following is a general overview of how to use the customer workstation 7 to request one or more check images. Reference is made to the functions described above.

Detailed Description Text (394):
At any time the user is at the main menu of the workstation software, the user may choose File/Enter Check Request, as shown in FIG. 7. Thereafter, the user is presented with a screen which permits entry of a request for one or more check images. An empty screen for the requests is shown in FIG. 10. If the user has previously stored, but not transmitted, a list of requests, these will appear in the window, these may be modified, and new requests may be entered. The list of requests may be printed, reviewed, and edited as desired. When the user enters a request, eg. clicks "ADD TO LIST" button, in the File/Enter Check Request function, the individual request is stored in a request file.

Detailed Description Text (399):
For each requested check, one .f file one a .b file is returned. The downloaded .f and .b files are stored on the local storage device 702 of the customer workstation 7. The .f and .b files, as discussed above, are named with unique sequence numbers and each contains TIFF images of one side of the check and other data stored within the TIFF files as tag fields.

Detailed Description Text (401):
i. View or Print Check Images

Detailed Description Text (402):
After the images have been downloaded, they reside on the local storage device 702. The user may select an image for display, File/Select/Display Check Image or printing, File/Print Check Image, as desired. A viewed file can be manipulated using the functions available in the View menu.

Detailed Description Text (403):
In addition, the workstation software preferably allows the user to select a previously created Microsoft Word.TM. (or other suitable word processor) document as a template, and incorporate the image of the front and back of the check directly into the text of the document.

Detailed Description Paragraph Table (6):

	ACCT.sub.-- NO Account number associated with the check request. CHECK.sub.-- NO Check number associated with the check request. AMT Amount of check, if entered by user in the check request. SER.sub.-- MODE Service mode selected by user, e.g. Overnight or Same Day. DATE Date check image (.b and .f) files received for this request. REQ.sub.-- DATE Date the check request is entered into the system. REF.sub.-- NO User assigned reference field. STATUS Status of the check request, e.g., Request, Pending, Received, Exported. CHK.sub.-- FRNT File name of the file contalning the image of the front of the requested check. CHK.sub.-- BACK File name of the file containing the image of the back of the requested check.

Detailed Description Paragraph Table (8):

	Reference: Menu Command
	A File/Enter Check Request B File/Select/Display Check Image C File/Print Check Image D Edit/Copy E View/Enlarge Check F View/Reduce Check G View/Rotate Image Left H View/Rotate Image Right I View/Invert Image J View/Reverse Video K View/Normal L Help/Contents

Detailed Description Paragraph Table (10):

	Account No. Self-explanatory Check No. Self-explanatory Amount Self-explanatory User Reference No. User defined field, for user internal tracking Status "Received": Requested Check image has been downloaded from host. "Not Found": Host unable to locate requested image. "Pending": Request sent to host, but image not downloaded yet. "EXPORTED": Check image downloaded from host without request. (e.g. Bulk Download) Requested Date the requested item was sent to host Received Date the retrieved image was downloaded from host Service Level of service selected by the user: "Overnight" or "Same Day"

Current US Cross Reference Classification (4):
705/45

Issued US Cross Reference Classification (1):
705/45

Field of Search Class/SubClass (10):
705/45

US Reference US Original Classification (29):
705/45

US Reference Group (29):
5544043 19960800 Miki et al. 705/45

CLAIMS:

1. A method for displaying an electronic image of a check having a front side and a back side, comprising:

storing an electronic image of both the front and back sides of the check;

retrieving the electronic image of both sides of the check; and

simultaneously and automatically displaying images of both sides of the check on a screen of a display device;

the step of simultaneously displaying comprising:

displaying the front side of the check in a first screen window of the screen in an initial horizontal format for normal reading by a user and displaying the back side of the check having an endorsement thereon in a second screen window of the screen so that the endorsement is disposed in an initial format horizontally for normal reading by a user.

2. The method recited in claim 1, further comprising providing user operated controls to allow selected ones of enlarging and reducing the size of the displayed images of the front and back sides of a check, rotating the images to improve readability and scrolling through the images.

3. The method recited in claim 2, further comprising providing a user operated control to highlight a selected portion of a displayed check image.

7. The method recited in claim 1, further comprising the step of providing a word processing function for the creation of a document and loading an image of a selected check into the document.

10. The method recited in claim 1, further comprising entering a user defined reference field as a part of said electronic image and providing said user defined reference field back to the user at the display device to enable sorting of check images according to said user defined reference field.

11. The method recited in claim 1, further comprising sorting said check images provided to the display device by at least one of account number, check number or amount embedded in the images.

13. Apparatus for displaying an electronic image of a check having a front side and a back side, comprising:

a memory for storing an electronic image of both the front and back sides of the check;

a computer for retrieving the electronic image of both sides of the check from the memory and;

a display for simultaneously and automatically displaying the electronic image of both sides of the check, the display comprising:

a screen and means for displaying the front side of the check in a first screen window of the screen in an initial horizontal format for normal reading by a user and for displaying the back side of the check having an endorsement thereon in a second screen window of the screen so that the endorsement is disposed in an initial format horizontally for normal reading by a user.

14. The apparatus recited in claim 13, further comprising user operated controls to allow selected ones of enlarging and reducing the size of the displayed images of the front and back sides of a check, rotating the images to improve readability and scrolling through the images.

15. The apparatus recited in claim 14, further comprising a user operated control to highlight a selected portion of a check image.

19. The apparatus recited in claim 13, further comprising a word processor for the creation of a document and means for loading a check image into the document.

22. The apparatus recited in claim 13, further comprising a user defined reference field entered by a user and forming a part of the electronic image and further wherein said user defined reference field is provided back to the user at the display device to enable storage of check images according to said user reference field.

23. The apparatus recited in claim 13, further comprising a control for sorting said check images provided to the display by at least one of account number, check number or amount embedded in the images.

24. The apparatus recited in claim 13, further comprising a local database at the display for storing request data for each requested check and further wherein the display comprises means for selecting an image for display, for comparing the request data for the requested checks to the electronic files supplied to the display and for displaying the electronic image whose TIFF file coincides with the data representing the requested check.

WEST

Generate Collection Print

L5: Entry 22 of 44 File: USPT Feb 9, 1999

DOCUMENT-IDENTIFIER: US 5870725 A
TITLE: High volume financial image media creation and display system and method

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Abstract Text (1):
An apparatus and method for high volume, and high speed, financial image creation and manipulation. Images of cleared checks are captured and combined with MICR data and customer supplied account history. A customer additional data field is incorporated to facilitate searching and retrieval of checks and electronic transactions. Check images are delivered in multiple media, e.g., CD-ROM, microfilm, as pre-selected by bank customer. Image workstation allows customers to relate specific issue data to paid check data captured by the bank. Cumulative transaction item index covers multiple accounting periods. Front and back of image of cleared checks can be manipulated on screen, and exported to other applications. Graphical user interface trilogy of screens--search, results and display, facilitate usage by customer.

Brief Summary Text (5):
The present invention relates generally to a financial document manipulation and display system, and, more particularly, to a high volume check image disbursing system and method.

Brief Summary Text (16):
A reader/sorter, or sorter, is a machine that magnetically recognizes the MICR line on checks to capture the information encoded there, and also uses the information to sort the checks into pre-specified temporary storage slots. This sorting results in a meaningful grouping of the checks that can be used for further processing. Reader/sorters in use at banks today are highly automated capture devices that can capture up to 100,000 checks per hour. At many banks, these machines have been augmented with cameras to allow for the creation of photographic and digital reproductions of checks as they pass through the sorter.

Brief Summary Text (25):
This Film and Index process consists of a separate capture pass (recapture pass), which is done sometime after the prime capture pass, most often on a monthly cycle, through which the reader/sorters would photograph (film) the items, assign a new sequence number (a number used for internal bank reference purposes), and associate the check serial number with the new sequence number. The photographs are used to create reproductions of the checks on rolls of microfilm. The sequence numbers and check serial numbers are cross-referenced on a paper report (or microfiche). With this index report, anyone can locate a check on the microfilm independently of the physical checks.

Brief Summary Text (38):
In the early 1990's, banks began to implement new cameras on their reader/sorters for capturing digital images of checks. New software and related equipment also was developed to make use of the new images. However, the focus of these implementations was on improving internal processes at the bank for Proof of Deposit ("POD") items, and to cut costs of delivering checks and bank statements to individual retail bank customers. For these two applications, only the front side of the check was needed. There was no effort to enhance the process of high-speed check capture for inclearings, nor was there a significant effort to provide images on any media other

than for printing on plain paper.

Brief Summary Text (39):
In spite of the development of specialized reader/sorters and new digital image cameras, the need of commercial customers were not being met. For example, to create a viable alternative to replacement of physical checks or film and index, commercial customers must have the backs of checks in addition to the front images. This requirement exists because the endorsement on the back of the check is usually a critical piece of information needed to respond to requests from vendors, employees, etc. Also, commercial customers, with their high volumes of checks, need their check images delivered on something other than paper to derive any value from check images.

Brief Summary Text (40):
Digitally captured images of checks have been used by some banks for limited purposes for commercial customers. In such enhanced check copy systems, the bank passes the checks through check imaging equipment, which stores the check image as well as the sequence number and check serial number, just like the Film and Index service. As with Film and Index, customers request check copies by using a check serial number, only with the new services the image is requested and delivered electronically into a personal computer. While this service eliminated some of the problems associated with Film and Index, it left many of the other problems unsolved.

Brief Summary Text (41):
One reason why these problems cannot be solved by an enhanced check copy system alone is because of the cost of storage of digital images. Storing image items for short periods of time, weeks or months, could be cost-effectively supported, but commercial customers need access to images of checks for up to seven years or more. In addition, to improve upon the standard Film and Index process would require storing information in an index database for seven or more years. Given the tremendous amounts of data that would need to be stored, along with the tremendous computer processing that would be needed to update the index database each day, this process is technically problematic and very costly as compared to the traditional Film and Index process. And as more customers would be added to the bank's database, the problems would only increase in complexity.

Brief Summary Text (42):
One of the most cost-effective media for storing, indexing and retrieving data and images is the compact disk (CD). This media also is quite appropriate for banking purposes because the CD ROM (Read Only Memory) format prevents the alteration of a check, thereby aiding in the use of the image as an accurate reproduction of the check for proof of payment.

Brief Summary Text (46):
"Positive pay" is a service where a file of MICR information from the bank is electronically matched against a file of issued item information from the commercial customer. The resulting mismatches are called "exception" or "suspect" items. Exception items are mismatched items that are different for an easily identifiable reason, like the amounts are different due to a bank MICR dollar amount encoding error. Suspect items are mismatches that result from not having an issue record from the commercial customer, which could mean the company made a mistake or that fraudulent items may have been presented to the bank. In either case, the commercial customer needs to review the actual check or check image (front and back).

Brief Summary Text (57):
With respect to these problems, an object of this invention is to provide commercial customers easy access to large numbers of check images, capture data and issue data on the media of choice in formats compatible to each customers needs which can be maintained for long periods.

Brief Summary Text (58):
Use is made of multiple host applications to combine the high speed capture of electronic check code line MICR data, check images (both front and back sides), reconciled corporate customer data, and media formatting and grouping host software to produce high volumes of selectable media types. The incorporation of an additional customer data field represents a significant advantage over the prior art. Commercial

customers find quite useful the ability to search for checks according to specific customer data. Examples of such data include invoice number, shipping order number, claim number, beneficiary name, social security number, employee ID, etc.

Brief Summary Text (59):
One significant media type supported is CD ROM optical media. This media has several advantages, such as reliability and the fact that check images contained thereon cannot be altered.

Brief Summary Text (60):
Another object of this invention is to utilize "matching" techniques that allows recapture of the check images at anytime after the original high speed code line capture (prime capture), performed for the "posting" of the check to a specific customer account in the Demand Deposit Account ("DDA") system. This recapture process allows the check image to be electronically matched to the data processed from the check when it was presented to the bank for payment and consequently updated on the commercial customers account record. Item images that are not matched electronically can be viewed on an electronic display and manually matched by a bank reconcilement clerk with the appropriated original posting data. This recapture process provides significant flexibility for handling commercial customer item images.

Brief Summary Text (62):
This invention also includes a personal computer image display application for use by commercial customers to maintain cumulative transaction item data in their company location with indexing to the check images. The transaction item data can be loaded into the archival data base on the client's own work station from the electronic media of choice (CD ROM, file transmission over dial lines, magnetic floppy disks, magnetic tape, etc.). The check images can be left on the media such as CD ROM's or transfused to magnetic disk hard drives on a storage server or work station hard drive.

Drawing Description Text (24):
FIG. 21 is a sample Image Display window, the third trilogy screen, showing the front image of a check in standard orientation. The item record index information is shown scrolled to the left.

Drawing Description Text (25):
FIG. 22 is a sample Image Display window, showing the back image of a check in zoomed and rotated orientation. The item record index information is shown scrolled to the right.

Detailed Description Text (3):
Most of a bank's commercial customers are set up on a month end statement cutoff date, typically known as a month end cycle. At this time, the bank provides a banking statement which reflects the activity for the month and gives current balance information. Instead of simply providing the commercial customer with actual checks or copies of their checks on microfilm, these customers are now given the option of receiving digitized check images in one or more types of media. In addition, the check image is coupled with useful data, making searching and retrieval of checks more efficient and useful. With regard to the variable media feature of this invention, if the customer chooses CD-ROM, all transactions for that accounts' accounting cycle will be written to the CD-ROM as an index file. The check images will also be written to the CD-ROM so that the image can be referenced back to an image item on the index. The customer also has the option to put their paid or check transactions on microfiche along with the associated check images.

Detailed Description Text (4):
Check images are acquired or captured by way of an end of cycle image recapture process. This recapture pass typically is performed in the bank's account reconcilement processing area. Commercial customers of a bank that have elected to participate or subscribe to this system, whether they are internal bank departments, such at Trust Services, or external bank customers, have their physical checks stored in account number order by date on a daily basis. At the end of the account statement cycle, which could be daily, weekly or monthly, an ARP reconcilement process is initiated whereby the paid and miscellaneous transactions are compared to the debits posted to the customer's Demand Deposit Account ("DDA") resulting in the prime capture

pass. A paid transaction is a check that has successfully been cleared by a bank. A miscellaneous transaction is a paper or electronic transaction that affects the balance of the account. At the same time the account is reconciled, the ARP clerk will send the physical checks for that cycle period to a check image recapture site. The image recapture process is performed in a batch processing environment. A customer's account is defined by a check processing batching entry number, which is used in a check processing operations department to track groups of work. This entry number follows the checks through their image life cycle and becomes a key field for identifying and retrieving groups of check images.

Detailed Description Text (6):
The general system overview and system flow are shown in FIGS. 2A-2C, 3A-3B and 4. The central system component is a mainframe host processor complex 1 which may typically be a System/370 processor manufactured by International Business Machines Corporation (IBM), Armonk, N.Y. 10504, including associated IBM 3380/3390 Direct Access Storage Devices (DASD) 2 and IBM 3480/3490 Tape Writers 3 and associated operator display terminals 4. The host complex may include tape storage devices, such as automated tape libraries, silos and drives 5 manufactured by Storage Technology Corporation, 2270 South 88th Street, Louisville, Colo. 80028, for long term archival of transaction item data and item images. The DASD 2 contains the Magnetic Ink Character Recognition (MICR) data which are on each check document and identifies the bank routing/transit numbers, the check number, the account number and the amount of the check. Included with MICR data would be system capture data such as capture sequence number, sorter number, capture date, entry number and cycle number. This data is typically contained in the IBM Check Processing Control System (CPCS) Mass Data Set (MDS). The compressed check images are also stored initially on system DASD 2 in the IBM Check Image Management System (CIMS) data base. The check images will be maintained on system DASD until access needs and volumes allow the images to be migrated to a more effective storage medium such as magnetic helical tape.

Detailed Description Text (9):
The DASD 2 and tape writers 3 attached to the central processor 1 can also be utilized to supply the customer data and images formatted for the specific customer system requirements. The check data and images can be stored in files on DASD for subsequent transmission to a commercial customer or they can be placed on a System Tape 3 for physical transportation and transfer to the customer's host system. The System Tape can also be formatted for processing by microfiche and microfilm third party processors.

Detailed Description Text (12):
Each commercial customer account is set up on a personal computer using a relational database, such as Check Solutions' System Control Facility (SCF) application. This application utilizes a relational data base to maintain a list of all accounts and unique processing parameters for that account, such as media type, number of copies, accounts associated with a customer number and suffix, customer names and addresses. This data is maintained on a personal computer and transferred to host files for processing by the Check Solutions Media Formatting Input application (MFI). The MFI application will process the listing of all "matched" items and associate all check data records including the image identification key for each account and will organize the data in groups by media format type. Thus all checks for each account to be included on a media for a particular commercial customer will be organized together and all commercial customers data for a specific media will be organized on the same MFI file.

Detailed Description Text (14):
The customer Image Display workstation then utilizes the electronic data from file transmission, floppy diskettes or CD-ROM's to create a cumulative transaction item record data base with the image identification key and volume numbers containing the desired image. Once the indicated volume containing the image files is addressed and linked (drive and path) the software application on the image workstation can access the specified image file, decompress the named image and display the image of the check or document on the workstation display. The workstation application can be used to request a specific image using serial number or bank capture sequence number along with the posting date. Also other record data can be searched for a listing of all possible items matching the specific search request. The ability to search on

commercial customer supplied data contained in the additional data field such as Payee name, social security number, employee number, claim number, invoice number, adds significant productivity savings for the commercial customer. The selected images can be transferred to the MS Windows clipboard or printed using the MS Windows Print Manager. Images from the clipboard can be inserted into word processing applications and print files from the Print Manager can be sent to fax processing applications or printed on attached printers.

Detailed Description Text (15):
In the overall summary, original check documents are processed on high speed image capture processors 6 such that digital images of the front and back of the check are stored on DASD 2. An image identifier key is associated with the MICR data in the IBM Check Processing Control System (CPCS). All financial transaction activity relating to a commercial banking account is collected in an account reconcilement plan system, such as the ARP System available from Servantis Systems, Inc. (formerly DISC, Inc.), 25 Crossroads Drive Suite 300, Owings Mills, Md. 21117-5450. The Wachovia ARP extract programs (SIF Creation, FIG. 7A), which retrieves appropriate data from the account reconcilement system master files, provides a means for the reconcilement clerk to specify the customer number ready for media creation and the date range of desired transaction data. The extract program determines all records associated with each account to be included on the customer media. The program also identifies which items have images and which items are just electronic transactions. The extract program also includes customer supplied data and the status of each item. This data is also formatted to be compatible with IBM's Statement Data File. The ARP extracted posted MICR data is then matched with the recaptured MICR data and associated with the captured digital images so that each item identified as having an image has the image identification key associated with the full transaction record data. Reconcilement clerks using an Image Enabled Workstation 7 locate and scan any missing images so that they are also associated with the proper transaction record data. The matched images and commercial customer transaction record data is then processed by Check Solutions' Media Formatting Input application to organize all customer accounts for a particular media format in the correct file structure with the processing parameters required by the IBM Host Data Conversion Interface applications. The Host Data Conversion Interface application then retrieves each digital image (front and back) for each record containing an image identification key and formats the image in the desired compression scheme. This data is then placed in a host file for transfer to the desired media. One media type could be compact disc (CD) writable media which could be used in conjunction with a CD authoring system such as the Data/Ware Development, Inc. Enterprise Authoring System which would produce CD ROM's that would contain a complete transaction item record index along with the digital images of the front and back of each check or document. The transaction item index would contain the posted MICR capture data, customer supplied issue data and the unique CD volume and image file location on the CD for each check image. A personal computer utilizing MS DOS/Windows and a display application such as the Wachovia Connection Image Workstation Application could then be used to update a cumulative transaction item record data base on the workstation with the new transaction item records from the current period CD. The cumulative index data base can then be searched by a variety of indexed fields to locate desired check images. The indicated CD volume can be loaded into an attached CD drive and the requested images displayed on the commercial customer workstation. Also the cumulative transaction item data base can be used for research and to assist with settlement of the current period data.

Detailed Description Text (23):
The SCF 110 uses the SCF Account Two file and sort type to indicate to the Sort Program Generator 120, such as Check Solutions' SPG 3.1 application, the specific account numbers that should have the check image scanned by the high speed image capture device such as the 3890 XP with 3897 image scanner available from IBM. As each item is processed, the magnetic coded MICR data on the code line of each item is processed and stored in the Mass Data Set 135. All code line data that passes the edits of the Sort Program Generator 120 will have the digital images of the front and back of each item stored in an image data base such as the Check Image Management System (CIMS) Data Base which is created by the CPCS 1.11 and ALS 2.0 host applications available from IBM.

Detailed Description Text (24):

Items that have no MICR data passing the edit will be directed to the system reject pocket. These items must be corrected and recaptured using a low speed reject repair system such as the Rejects Application available from BANCTEC SYSTEMS, INC. a division of BancTec USA, Inc., 10 Inverness Center Pkwy., Suite 400, Birmingham, Ala. 35244. These items must then be added to the image data base using the missing item process and low speed scanners discussed later. Items that have partial code line information recognized such as account number or routing and transit or amount or serial number fields will be temporarily rejected by the check processing system, however the image will be stored on the image data base. This code line data can then be corrected by keying the correct code line data using the on line reject repair (OLRR) application 150 within the Check Processing Application. After all rejected code lines are correct the system will have all MICR code line data placed in the MDS 135 and images associated with that code line data will be contained in the image data base CIMS 145. The mass data set also contains the unique image identifiers that are used to access all images segments (front and back with black/white or gray scale image compression) for a specific item MICR record on the MDS 135.

Detailed Description Text (39):
The functional flow of the image in the HPTS Statement Application is shown in FIG. 7B. An extract application such as the CISX application 160 available from Check Solutions would be used to take all captured items in the Mass Data Set 135 and the CIMS Image Data Base 145 and places them in the Recapture Data File (RDF) 165 arranged and formatted to be compatible with the Statement Application (See FIG. 5). Once the SIF file is created for a cycle, the ARP area notifies the check operations area of the of the cycle number and the entry number. The check operations operator logs onto image CPCS and brings up CISX for the CPCS cycle the recapture items were captured under. An option to create a RDF (Recapture Data File) is requested bringing up options for the available cycles. The operator chooses the cycle the ARP area identified and then enters the entry number(s) for that cycle. CISX will start a task to retrieve the MICR code line and item sequence information for that entry on the MDS and loads it into a RDF file. The PMF (Profile Management Facility) available from IBM, is used to identify the correct input and output files by cycle. The RCM job for that cycle will be triggered once the RDF file is created. The Check Solutions developed Statement Data File Preprocessing application 230 would also be executed on the Image ARP SIF 216 file. This application would truncate and save all carry along data (customer issue data and ARP system data) and then format the remaining check posting data in the Statement Data File (SDF) 231 formats used by the HPTS Statement Application.

Detailed Description Text (40):
The HPTS Statement Application Suspect Selection 220 and Suspect Processing 225 programs process the Suspect Image File 146 created during image recapture and changes the MICR record data so that all suspect items match with the posted MICR data. Various data fields are changed to all 9's in the modified and sorted RDF file 235. The HPTS Statement Recapture Match Application (RCM) 245 matches all checks captured on the image processor and listed in the RDF file to the Statement Data File (SDF) 240 that was constructed from all items marked as Image items from the items posted to the customer account for the period of time requested by the reconcilement clerk. The matching process uses the routing and transit number, the account number, the serial number and if desired, the amount from the MICR data. All records in the RDF 235 that match the SDF 240 will be passed to a Check Solutions developed Exception Split Application 250 via two files, the Account Summary File (ASF) 252 and the Image Access Key (IAK) 251. Items that do not match the SDF will be listed as "free" items 263, 264 and items that are not included in the RDF will be listed as "missing" items. The IBM HPTS Statement Interactive Session (SIS) 255 application allows an operator to view "free" images on the Image Enabled Workstation 7 and match up the image with the "missing" MICR record data. Once all free items are matched, the remaining missing items can be located and scanned using the low speed scanner 8. All suspects that were forced as missing can also be physically located among the recaptured items using the recapture sequence number printed on the back of the physical item and then manually scanned into the system using the low speed scanner 8. After the missing and free items are matched these records 251, 257 are also passed to the Check Solutions developed Exception Merge Program 265 via the IAK files. The main purpose of using this Recapture Match (RCM) 245 process is to link the posted MICR code line data captured when the item originally was posted to each customer's account, to the Image

Access Key (IAK) 266, 267 for the recaptured image of the item that was assigned during the high speed image capture. This image recapture can occur any time after the original code line was captured and posted via prime pass item processing.

Detailed Description Text (50):
The CD creation process requires multiple files. The HDCI program 300 is set up to create all files required by the Data/Ware host Image Build application. The HDCI program creates a Build Control file, Build Content File, Image Files, Index File, Application Control File, Abstract File, Copyright File, Bibliographic File, Data Preparer File, Publisher File, Application Identifier, Boot Record, CD Label (WHATCD.TXT), CD Volume (WHATVOL.TXT), CD Copy (WHATCOPY.TXT), and Shipping (WHERECD.TXT). Some of the above files are in host EBCDIC data format. However a number of the files have to be in ASCII format as it would appear on the CD ROM. The file naming on the CD ROM also must be consistent with DOS file naming conventions. The HDCI application 300 maps the host file names to conventional DOS file names and performs file format conversion where ASCII format is required. Another feature of the HDCI program 300 for CD media is to keep track of the file size as it builds records and images and determines when a new CD volume must be allocated. The HDCI program can define the CD size and generate multi-volume sets. It can also place an index on each CD for the item records on that CD and can also include a cumulative index on the last CD volume with all items records for the full volume set. The index file is generated as the records are processed and images are retrieved from CIMS. HDCI Parameters establish how many images to place in an image file and how many image files to place in a directory so that conventional DOS Directory naming conventions can be maintained when a single CD may contain 20,000 to 30,000 image files. This transaction record index built by HDCI contains the posted MICR data, check processing data, commercial customer issue data, ARP system data, the volume name of the CD containing the image, and the Item name indicating the file and location within the file for the front and back image segments. This transaction record index file can later be used by an image workstation application to locate and retrieve the specific check or document images from the CD ROM's.

Detailed Description Text (59):
The tape output could also contain a number of commercial customers with multiple accounts each. This data could be used to create a special media such as microfiche by an outside third party processor. The functional flow of the microfiche creation and distribution process is shown in FIG. 12 at 329, 529, 535, 541. The microfiche processing vendor would write specific extract programs to pull each record for an account and build an index containing the specific posted MICR data and/or commercial customer issue data and ARP System data for each item record for an account. The specific record data can be extracted from the provided system tape along with each front and back image of the checks which can also be processed by the microfiche production software to place the digital images and associated data on microfiche. The microfiche production software can update the account item record database as to the microfiche page and grid location assigned to each item during the microfiche page layout processing. This would enable an index to be printed and placed on an index fiche. The index could be produced in serial number sequence and an additional index could be done in amount sequence. The image would be placed on Image microfiche pages. The transaction item index and image microfiche would be produced for each customer account using this form of media.

Detailed Description Text (60):
Another form of media is writable CD ROM, such as Kodak's Writable CD with Infoguard.TM.. The functional flow of the CD-ROM creation process is shown in FIG. 9 at 505, 506, 510, 511, 515, 520. CD Authoring Software, such as Data/Ware Development Inc.'s Image Build host software 510, can be used to create the actual files in the ISO 9660 format required by any PC running MSCDEX drives and a CD ROM reader. The ISO 9660 CD format is universally recognized and used. This is an ideal media because CD ROM conforming to the ISO 9660 format can be played in a CD ROM drive in virtually any PC. The Writable CD technology also provides a cost effective way to provide individual "one offs" of a CD-ROM to large numbers of users without incurring high set-up and production cost associated with typical CD ROM technology previously used. In the industry, it is typical for one master CD to created, then numerous copies of that master made from it, such as to distribute technical manuals to a plurality of locations. In this innovation, it is typical for a unique original CD to be created

for each individual commercial customer since each one's check images are always different, one from the other. A CD-W can hold 550 to 600 megabytes of data. Commercial Checks (front and back) average approximately 25,000 bytes of data for the IBM ABIC compressed black and white images. The transaction item index record contains approximately 250 bytes of data for each item record. This yields a capacity of approximately 22,000 to 24,000 checks per CD ROM.

Detailed Description Text (61):
The Data/Ware Development Inc. authoring software is a collection of IBM MVS software applications which prepares all the data files created by the HDCI application 300 for transfer to the CD writing equipment. The EAS Image Build software 510 is a mastering application which builds an ISO 9660 CD-ROM "image" by arranging the files in the required standard formats. This "image" is the digital data in the final form as it will be transferred to the CD-ROM. This "image" includes all standard files required by ISO 9660 along with the commercial customer specific data (index records and check images). Once the prepared CD "image" is created, it is copied to the EAS Creation Hardware 10 by means of standard IBM utilities such as the IEBGENER program. The EAS creation hardware 10 is a hardware subsystem which attaches by means of a channel interface to a host mainframe. The creation hardware emulates a standard IBM 3480 cartridge tape subsystem. Data created by the Image Build software 510 is output to the creation hardware as if it were a write to tape. The data is transferred to the Data/Ware Development, Inc. Control Unit 10 which captures the data initially onto a Winchester disk drive which is attached. Once the entire CD "image" is written to the disk drive, then the actual writing of data to the CD can be initiated.

Detailed Description Text (66):
The channel attached control units 10, as shown in FIGS. 2A-2C, with 2.times. or 6.times. writers make it feasible to produce larger quantities of customer unique data on a CD in high volumes. Each IBM 3890 XP with image scanner 6 can realistically capture and digitize the front and back of 80,000 to 90,000 documents per hour. In a typical two shift operation, this would yield 1.2 to 1.4 million checks. If the total two shift output of checks were placed on CD's, the CD authoring system 10 would have to approximately 50 to 64 full CD's. A Control Unit 10a with two 2.times. CD writers and an autoloader can produce 64 CD's in the same two shifts. The combination of this mainframe attached CD authoring system with the high speed document image capture processors provides an efficient high volume process for delivering large volumes of digital check images and other associated electronic data to customers on a media that is easily transported and can also serve as a long term archive of the data. Previous methods of storage and delivery have prevented the transfer of large volumes of digital check images to large numbers of customers in a timely fashion.

Detailed Description Text (69):
The customer interface to the electronic digital data created by the high volume financial check image media creation system is a personal computer running an image display application. An implementation of the image display application could be the Wachovia Connection Image Workstation.

Detailed Description Text (76):
These components (which will be described later in the order shown above) are installed to a fixed drive attached to a stand-alone microcomputer to provide search and retrieval functionality for transaction item indexed account reconciliation data and related images that have been archived to CD-ROM by a high volume financial check image media creation and display system shown in FIGS. 2A-2C, 3A-3B, and 4.

Detailed Description Text (99):
Entering Serial Number only is an efficient means of locating an item. If the Serial Number is unavailable, the Account Number and Amount fields can help to narrow the scope of the results list. The Additional Data field can help locate items using varied check issue data, such as Purchase Order Number, Invoice Number, Payee Name, or Payee Account Number (according to the information the company has chosen to record in this optional field). The use of wildcards and customer selection of special characters also allows this additional data field to contain multiple data elements such as Payee name using the special character # to begin this data and the special character $ to begin the invoice number. A wildcard search using # plus the specific name would only retrieve records with # and the specific name. The inclusion of the

additional data, which can be in any order or form desired by the customer, provides the ability for a customer to tie together (or relate) key internal information know only in the customers data systems to the physical check that cleared through the bank. For example, this allows Payee names to be searched and all checks written to that Payee over a given period of time to be displayed quickly and easily. This previously would have required the customer to access their own separate computer database, such as an Accounts Payable database, to get a list of all serial numbers of all checks written to that Payee and then individually manually search rolls of microfilm to select and copy each check image. Also this additional data field provides advantages over other image retrieval systems in that each serial number would not have to be manually searched because they are returned by the automated search to the users workstation display.

Detailed Description Text (151):
In the image display area, the orientation, zoom selection and video display preferences can be saved from check to check or even every day, providing great productivity gains where repetitive endorsement reviews are required. Every check requested (which could be thousands per day), would have the endorsement rotated and zoomed to clearly show the signature from the back of the check the first time the image is displayed without further manipulation of scroll location or settings.

Detailed Description Text (164):
By combining the archive features of cumulative index records and CD ROM libraries with dial-up requests from the bank data bases and systems, enhanced capability can be realized by providing access of an image immediately after it is captured in the bank. This allows positive pay, payable through, and complete check copy functions to be performed on the same workstation. Providing the flexibility where the search requested can be quickly switched from an archive search of the commercial customer's data base to a check image request of a specific check requested from the bank's image data base would greatly enhance the workstation's capability. Likewise, the search data will be automatically transferred during the search screen switch from archive to on-line.

Detailed Description Text (166):
In another embodiment of this invention, the re-capture item passes are eliminated. While the item re-capture processing allows a bank to implement the system very quickly, it increases the cost somewhat to the check processing department. Eliminating the re-capture pass implies that the checks to be imaged will be both MICR captured in a conventional check processing environment and image captured in the same primary pass through the reader/sorter. By providing the MICR capture and the IMAGE capture at the earliest point, subsequent rehandle passes are eliminated, along with their accompanying work flow issues.

Detailed Description Text (167):
Additionally, by combining image capture into the MICR capture pass, every prime pass item can be easily available for image capture. By capturing the images of all items passing through the reader/sorter on prime pass, several additional advantages arise. For example, with the check image technology that is being employed, retention of the check images is planned to be seven to ten years. With an entire day's worth of work available along with the corresponding images of the items, back office work flow areas can be re-engineered, streamlining the image retrieval functions which are now limited to microfilm or microfiche retrieval in manual modes.

Detailed Description Text (168):
In addition, if all of the items for an entire month or year are retained in a near on-line tape robotic silo, retail or corporate customers could have access to check images via a personal computer on-line connection to the bank. This will have the effect of reducing operational costs to the bank by allowing additional incentives for customers to allow the bank to safekeep the items and not return them in the monthly bank statement, which is the state of the art today. This could also have the effect of allowing new banking products to be developed which are directed to these new markets.

Detailed Description Text (170):
The Wachovia Connection Image Workstation offers commercial customers a simple and

permanent way to archive paid checks, electronic payments, and other transactions while simplifying and speeding access to the stored images and data. The Wachovia Connection Image workstation, in combination with the High Volume Financial Image Media Creation System allows customers to relate their specific issue data to the paid check data captured by the bank in a cumulative transaction item index which ties together data from multiple accounting periods. The Wachovia Connection Image Workstation software lets the company enter search criteria, such as dollar amount or check serial number, to locate and display one or more check images in seconds. Once displayed, the image and its transaction item index information can be printed, faxed, or exported into other MS Windows-compatible applications such as MS Word or MS Excel.

Detailed Description Text (178):
This file is created by Wachovia and is used to generate tape output of check images. The file can be used for one customer or multiple customers. The file is a sequential data set with variable block format. There is one output data record for each ARP data record. ARP electronic (non-image) records and customer supplied issue data can generate an output data record even when physical checks are not present. The output consists of the following general layout:

Detailed Description Paragraph Table (6):
TABLE 2.5 _____ Name Length Type Description _____ Routing Number 10 Routing and Transit (RT) Field Account Number 18 Account # field Serial Number 10 Check Number field Amount 8 Amount field Statement Sequence 3 Value = Zeros Number Process Control 6 Process Control (PC) field CIMS Key 44 Check Image Management System (CIMS) indexing key Item Status 4 One byte for each of the 4 possible segments (FBW, FGS, BBW, BGS; FGS & BGS not supported) X`00`-Image data absent X`01`-Image data present X`11`-Replacement data present Item Length 24 Six bytes for each of the 4 possible segments (FBW, FGS, BBW, BGS; FGS & BGS not supported) (5-byte length followed by 1-byte filler) Segment 1 image Data Var. Data will be compressed in (FBW) CCITT G4 MMR (Modified Modified Read) per the CCITT G4 specifications. TIFF Tag See Section 2.6 TIFF Tag Segment 3 Image Date Var. Data will be compressed in (BBW) CCITT G4 MMR (Modified Modified Read) per the CCITT G4 specifications. TIFF Tag See Section 2.6 TIFF Tag _____ NOTE: FBW = Front Black/White FGS = Front Gray Scale BBW = Back Black/White BGS = Back Gray Scale

Issued US Original Classification (1):
705/45

Current US Original Classification (1):
705/45

Field of Search Class/SubClass (18):
705/45

CLAIMS:

7. The method of claim 6 wherein the images comprise fronts and backs of checks.

25. The system of claim 24 wherein the financial document images comprise fronts and backs of checks.

50. A computer-implemented method of providing financial transaction information to a bank customer comprising:

(a) compiling checks having financial document data field and bank-generated account data field from a plurality of payees;

(b) creating computer-readable images of the checks;

(c) capturing financial data from the checks;

(d) compiling customer-provided additional data field corresponding to the checks, the customer-provided data comprised of data specified by the customer to facilitate

searching of the images said customer-provided additional data field having been provided previously by a customer and stored on a database at a financial institution for correlation with said financial document data field and said bank-generated account data field to facilitate searching of the images;

(e) preparing the computer-readable images, financial data and customer-provided data into a format suitable for storage on a storage medium;

(f) transferring the prepared data to the storage medium; and

(g) distributing the medium to a customer.

61. The package of claim 59 wherein the images comprise the fronts and backs of checks.

71. A computer system for searching, retrieving and displaying check images having financial document data comprising:

(a) means for searching and retrieving at least one check image stored in a data structure using search criteria comprising bank-generated account data, customer-generated additional data, customer-specified non-MICR code line data specified by the bank customer said customer-generated additional data having been provided previously by a customer and stored on a database at a financial institution for correlation with said financial document data and said bank-generated account data to facilitate searching of the images.

(b) means for displaying the at least one check image retrieved in step (a).

73. The computer system of claim 71 where the search criteria further comprises bank-specified data correlated to the check images.

74. A computer-implemented method of searching, retrieving and displaying check images having financial document data, customer-generated additional data and bank generated account data comprising:

(a) searching the check images stored in a data structure using search criteria comprising customer-specified non-MICR code line data specified by the bank customer said customer-generated additional data having been provided previously by a customer and stored on a database at a financial institution for correlation with said financial document data and said bank-generated account data to facilitate searching of the images;

(b) retrieving the results from step a);

(c) displaying the results from step a).

76. The method of claim 74 where the search criteria further comprises bank-specified data correlated to the check images.

WEST

Generate Collection Print

L5: Entry 24 of 44 File: USPT Nov 3, 1998

DOCUMENT-IDENTIFIER: US 5832463 A
TITLE: Automated system and method for checkless check transaction

DATE FILED (1):
19960328

Abstract Text (1):
The automated improved check processing system and method includes a data entry device (200, 202) for receiving checking account information (304, 306, 308) and a check amount (302) of a check (210, 300) provided in a transaction. The transaction may take place at a bank teller window or a point-of-sale. The checking account information and check amount are electronically transmitted to the institution or servicer (208) drawn on for electronic presentment and posting to the proper checking account. Additionally, an image capturer (204) may be used at the time of the transaction to obtain a digitized image of the face of the check. The captured image may then be forwarded electronically to a database, which is readily accessible for research purposes.

Detailed Description Text (3):
FIGS. 2 and 4 are a block diagram and a flowchart of automated checkless check transaction system and method therefor, respectively, and both are referenced in the description below. The instant system and method are applicable to bank teller transactions, point-of-sale transactions, as well as any other transactions in which a check is provided as payment or for deposit. Beginning at block 400 of FIG. 4, an automated checkless check transaction according to the present invention begins by obtaining a check amount as written on the check, as shown in block 402. Check amount entry may be performed by the bank teller or cashier on a numerical keypad 202 (FIG. 2) or any other suitable data entry device. The check is also passed through a MICR reader 200 to read the checking account information pre-printed on the check, as shown in block 404. FIG. 3 shows a representation of a check 300, with the MICR line located on the bottom of the check. Numerals 304 are transit and routing information, numerals 306 are the checking account number, and numerals 308 are the check serial number. The check amount 302 is written in two fields on the face of the check. In bank teller transaction applications, the depositor's account number, as shown on the deposit slip, may also be read by MICR reader 200. Alternatively, the depositor's account number may be entered manually. A device 204 is further used to capture an image of the face of the check, including the account owner's signature, as shown in block 406. Device 204 may be a digital camera that captures the image of the check and transform it into digital bits of data.

Detailed Description Text (4):
The checking account information, check amount, and the check image are then transmitted electronically to a checkless transaction system 206. The depositor's account information is also transferred, if applicable. All the relevant transaction data may be stored in a database 207 coupled to checkless transaction system 206 for ready accessibility. At the time of presentment, all the relevant information associated with the check is in electronic or digital form, therefore the need for maintaining and handling the paper check becomes obsolete. The paper check may be truncated or marked in some way to indicate that it has been processed and returned to the customer. The customer may then do as he/she pleases with the check. He/she may keep it for a number of years or discard it.

Detailed Description Text (5):

The connection between MICR reader 200, check amount entry device 202, and image capturing device 204 to checkless transaction system 206 and database 207 may be via a dedicated or switched telecommunications line. Although shown as separate entities, MICR reader 200, check amount entry device 202, and image capturing device 204 may be implemented as an integrated input device. Checkless transaction system 206 is in electronic communications with the banking institution or a servicer contracted to perform the checkless transaction function 208. A computer terminal 209 may be coupled to database 207 directly or indirectly through checkless transaction system 206. Checkless transaction system 206 and database 207 may be located on-site at bank/servicer 208 or may be located remotely therefrom. Indeed, the location of each piece of hardware or the execution site of any software need not be limited to any locale, as its location is inconsequential to the operations of the system and performance of the process.

Detailed Description Text (7):
In operation, the time-consuming and tedious steps of handling and encoding the checks at various stages of the check processing procedure are eliminated by the automated system and method of the present invention. Because the physical handling of the checks is avoided, significant cost reduction is realized for the savings in labor, machinery, and office space. Errors that may be introduced at this step are also avoided. Research of past check transactions, such as for transaction or legal analysis, may be performed through terminal 209 or any other terminal having access to database 207. A separate image database (not shown) may also implemented to maintain and store only the captured check images for research purposes. It is contemplated that, alternatively, check images may be kept on microfilm for research purposes.

Current US Cross Reference Classification (4):
705/45

Issued US Cross Reference Classification (4):
705/45

Field of Search Class/SubClass (8):
705/45

US Reference US Original Classification (17):
705/45

US Reference US Original Classification (23):
705/45

US Reference Group (17):
5175682 19921200 Higashiyama et al. 705/45

US Reference Group (23):
5412190 19950500 Josepson et al. 705/45

CLAIMS:

1. An automated point-of-sale transaction system for generating a checkless transaction record from a check tendered at the point-of-sale, comprising:

an input device receiving checking account information and a check amount of a check drawing on a checking account provided in a transaction;

a database coupled to said input device for electronically receiving and storing said checking account information and check amount;

an electronic transaction processor for electronically forwarding said checking account information and check amount to an institution drawn on by said check; and

an image capturer for capturing an image of said check.

5. The system, as set forth in claim 1, wherein said image capturer digitizes said captured check image.

14. A method for generating a checkless transaction record at a point-of-sale from a check tendered at the point-of-sale, comprising the steps of:

receiving checking account information and a check amount of a check provided in a transaction, said check drawing on a checking account provided by an institution;

capturing an image of a face of said check, including a signature inscribed thereon; and

electronically transmitting said received checking account information and check amount to said institution.

23. The method, as set forth in claim 14, further comprising the steps of:

electronically transmitting said check image to an image database; and

storing said check image in said image database.

WEST

Generate Collection Print

L5: Entry 36 of 44 File: USPT Jun 14, 1994

DOCUMENT-IDENTIFIER: US 5321238 A
TITLE: Banking apparatus for processing the bill and the check

DATE FILED (1):
19910709

Abstract Text (1):
A terminal banking apparatus for processing bills and checks includes an input apparatus for inputting the number of each account and the amount of bills or checks at a front counter of a bank, a tentative paying file for storing the number of each account and the corresponding amount input from the input apparatus, a magnetic ink character reader for reading the number of the account described by magnetic ink characters on each of the bills or checks carried, and an amount reader for reading the amount described on the bills or checks stored in the tentative paying file depending on the number of the account read by the character reader. Also included is an amount encoder for describing the amount with magnetic ink characters on the bills or checks, a total amount checking apparatus for checking the total amount depending on the amount read out and a preset total amount, a lateral-line marking apparatus for marking lateral lines on bills or checks, an imaging apparatus for taking photographs of both the front and rear surfaces of bills or checks which have completed all processings, an image file for storing photographs and a transfer apparatus for transferring bills and checks.

Brief Summary Text (9):
Lateral lines are impressed (ST6) on all bills or checks in the stacker, the amounts of bills and checks are summed (ST7) for obtaining a total amount and it is collated (ST8) with the total amount input to the amount checking apparatus. If these are matched, the front and rear surfaces of bills or checks are photographed (ST9) and are stored under the assumption that there has been no error in the input processing. If these are not matched, the input processing for all bills and checks is retried (ST10) under the assumption that there have been errors in the input processing. This check must be continued until such amounts are matched. Those to be transferred to the bill clearing house among the bills or checks having completed the processing mentioned above are gathered with attachment of a tag describing the total amount and a number of sheets of bills and checks.

Brief Summary Text (24):
an imaging apparatus for photographing the front and rear surfaces of bills or checks which have completed the processing;

Brief Summary Text (25):
an image file for storing image data of the photographed bills or checks; and

Brief Summary Text (27):
Namely, in the present invention, the number of the account and the amount described on the bills or checks are input to an input apparatus at the front counter and stored in the tentative paying file. The number of the account described by the magnetic ink on the bills or checks is read by the magnetic ink character reader. The amount reader reads the amount described by a bill or check from the tentative paying file based on the number of the account read out and the amount encoder describes such amount with the magnetic ink to the predetermined area of a bill or check. Moreover, the total amount checking apparatus checks a total amount from the amount read out and a preset total amount and the lateral-line marking apparatus impresses lateral lines to a bill

or check on which the amount is described (i.e. written or imprinted) by the amount encoder. The imaging apparatus takes a picture of the front and rear surfaces of a bill or check having completed such processing and stores image data representing an image of the bill or check in the image file. A bill or check is sequentially transferred to the magnetic ink character reader, amount encoder, lateral-line marking apparatus and imaging apparatus by the transferring apparatus. As explained above, since the number of the account and amount are input once to the input apparatus at the front counter in the bank, generation of input errors may be reduced. In addition, the processing steps for processing a bill or check in the back office are carried out automatically by utilizing the data input at the front counter and moreover without manual operation.

Detailed Description Text (7):
Next, the front and rear surfaces of the bill or check having completed such processing are imaged or photographed by the imaging apparatus 10. The image data for the photographs are stored in an image file 11.

Detailed Description Text (9):
In the back office 22, the numeral 25 designates a hopper to which the bills or checks having completed processing at the front counter 21 are carried in; 26, a magnetic ink character reader (MICR) for reading the number of account described by the magnetic ink in the predetermined region of a bill or check; 27, an amount reader for reading the amount of a bill or check from the tentative paying file 24 depending on the number of the account read by the magnetic ink character reader 26; 28, an amount encoder for printing the amount read by the amount reader with the magnetic ink to the predetermined region of a bill or check; 29, a lateral-line marking apparatus for marking lateral lines on a bill or check; 30, an imaging apparatus comprising a couple of image sensors for taking pictures of both surfaces of a bill or check; 31, an image file for storing image data of pictures taken by the image sensors; 32, a total amount checking apparatus for subtracting the amount read by the amount reader 27 from the total amount input previously from the tentative paying file 24 and checks finally that the amount becomes zero; and 33 is a sorter for sorting bills or checks which have completed all processing.

Detailed Description Text (30):
In timing with transfer of a fourth sheet of bill or check to the magnetic ink character reader 26, the first sheet of bill or check, on which the lateral lines has been marked, is extracted by the roller R5 from the lateral-line marking apparatus 29 and is then transferred to the image sensors 30 by the roller R6 of the transfer apparatus 34. Both surfaces of the first sheet of bill or check are photographed and the image data of pictures are then stored in the image file 31.

Current US Original Classification (1):
705/45